Chemical Age

B.H.C.'s 3rd Ethylene Plant on Stream

(page 57)

VOL. 84 No. 2139

9 July 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

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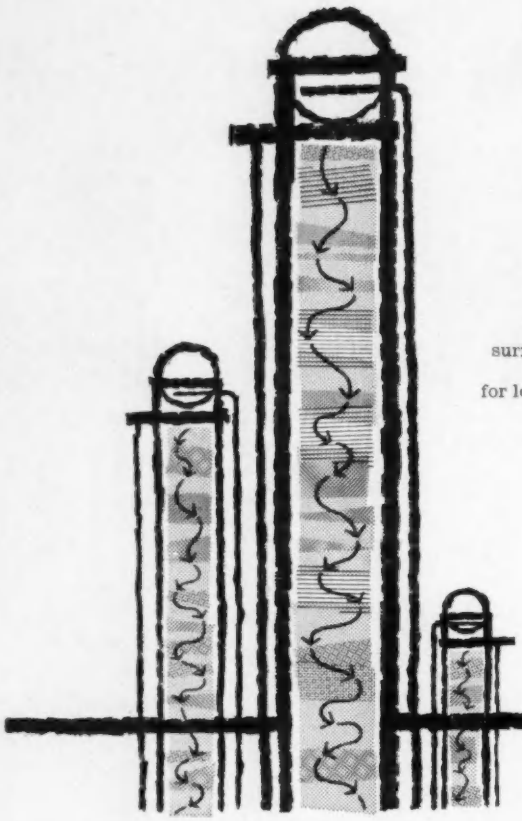

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BAC/19A

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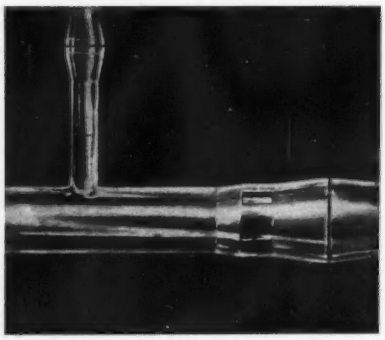

For easily assembled joints between pilot plant pipelines and apparatus these joints are ideal.
Buttress Joints with smooth ground flat faces ensure a robust seal with a simple gasket.
Available separately or fused to tubing or apparatus, these joints are secured with a simple clamp and are not liable to seize up with such materials as silicon tetrachloride.

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- **SAFER IN USE**
- **GREATER FLEXIBILITY**

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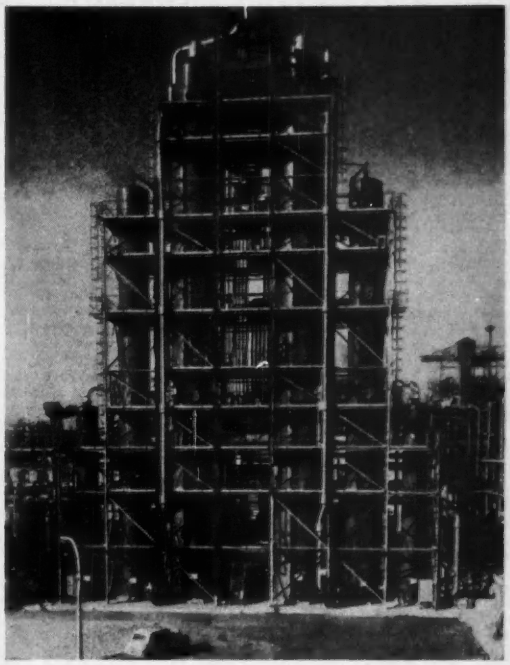
P.G. Engineering Ltd. designs, supplies and erects process plant and equipment for the chemical and allied industries, providing either process engineering or a comprehensive turn-key service which covers all phases from initial conception to the handing over of a producing unit.



Benfield hot potassium carbonate plant for the removal of carbon dioxide, designed, engineered and supplied by the company as part of the extensions to an ammonia synthesis gas plant.

PGE

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STOCKTON-ON-TEES AND LONDON

MEMBER OF THE

POWER - GAS GROUP

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(Continued on page 40)

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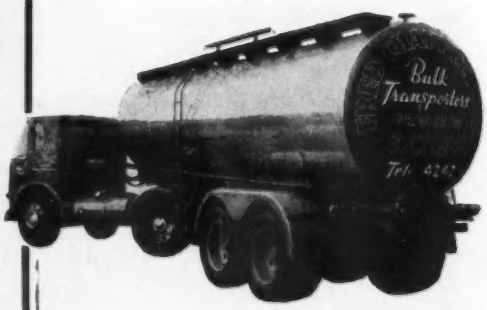

CHEAPER TECHNICAL GRADE CHLOROFORM

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A SOLVENT FOR:

- —extraction of penicillin and other pharmaceutical products
- —oils, fats, resins, lacquers
- —cellulose acetate, polyvinyl acetate, benzoyl cellulose, cellulose acetate-butyrate, and polystyrene
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TYPICAL CHARACTERISTICS

Non-inflammable		
Clear and colourless		
Free halogens		not detected
Specific gravity at 15.5/15.5°C		1.502
Distillation range (5—95%)		0.3°C
Residue on evaporation at 110°C	%	<0.001
Moisture H_2O	%	0.023
Acidity as HCl	%	0.0001

DELIVERY IN BULK AND IN DRUMS

For further information, please consult—

IMPERIAL CHEMICAL INDUSTRIES LIMITED
LONDON S.W.1

ICI
GENERAL CHEMICALS DIVISION

GC.13a

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WHEREVER AN INERT FILLER
IS REQUIRED FULLERSITE
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PORT PENRHYN, BANGOR, NORTH WALES

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to obtain the services of a chemical engineer, chemist, laboratory assistant and other fully qualified personnel

is through a classified advertisement in Chemical Age

Full details will be found on page 76

Better temperature measurement & transmission with the new

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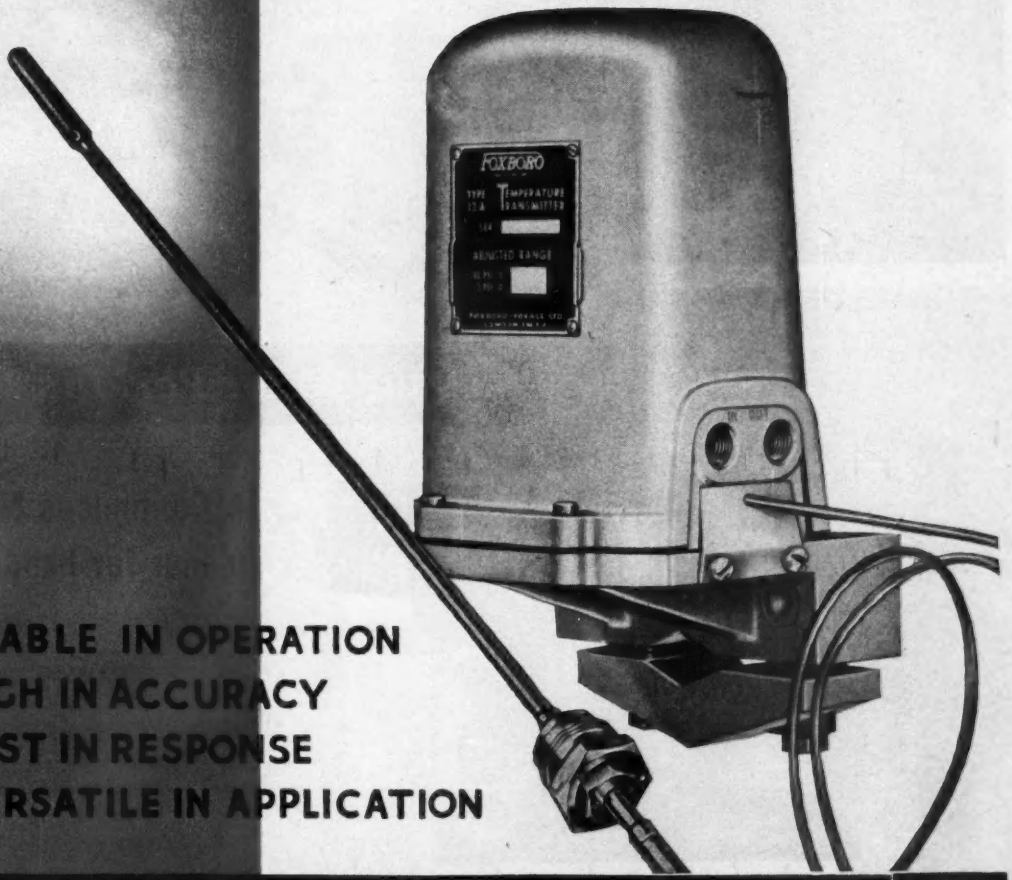
M/12A Pneumatic TEMPERATURE TRANSMITTER



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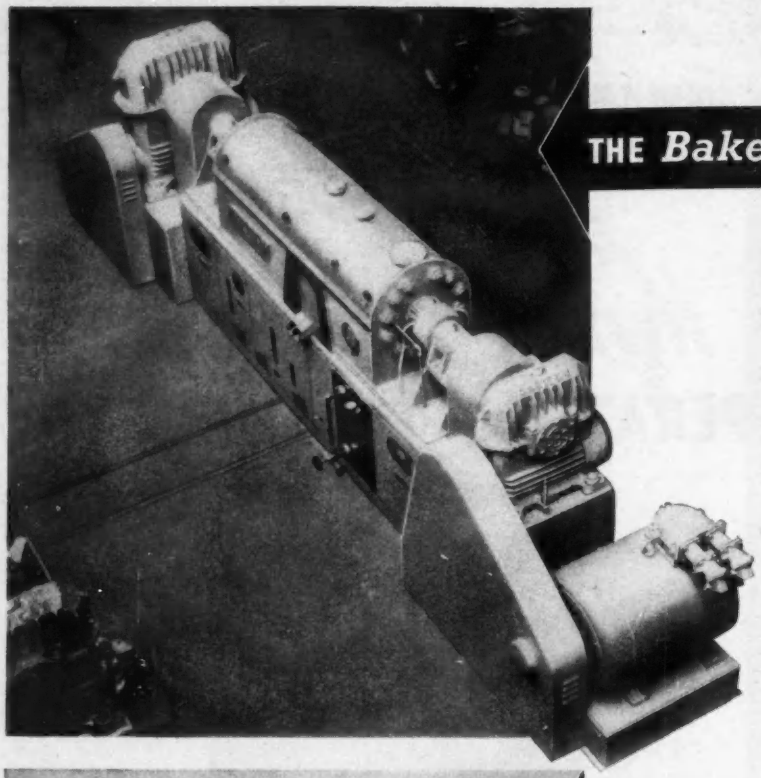

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A Continuous Mixer with Heat Exchange for

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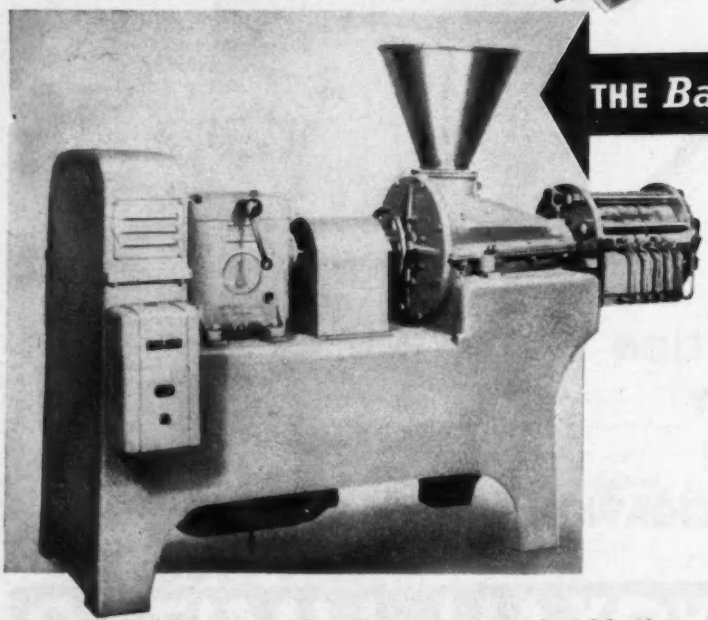

THE *Baker Perkins* ROTOFEED

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DOUGHS, PASTES, SLURRIES

AND RESINOUS DOPES FROM

METERED SOLIDS

LIQUID FEED SYSTEMS.

Our Laboratories at Peterborough are equipped for demonstrations and we advise on and develop particular projects through all stages from pilot plant assessment to production plant trials.

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BP/CM4

The pay-off is in production

SD announces successful start-ups of 5 more plants

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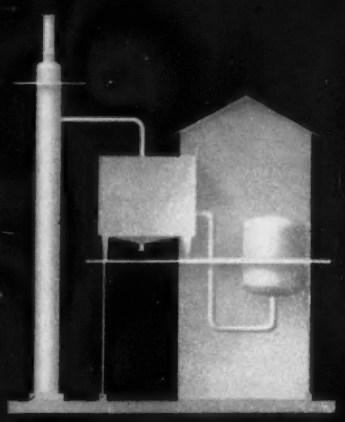
Illinois



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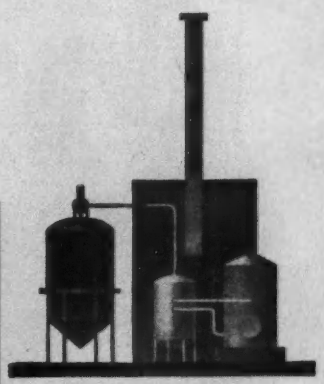

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AMERICAN CYANAMID COMPANY
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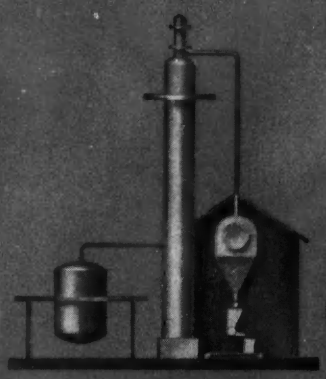

MALEIC ANHYDRIDE

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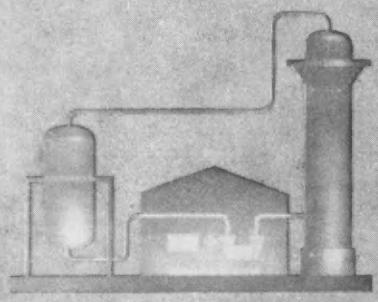

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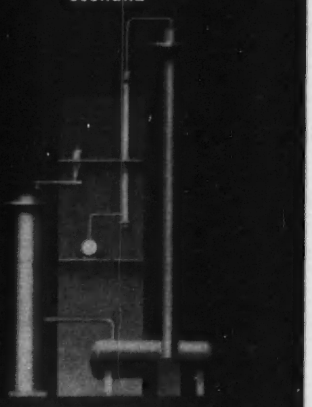

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These systems possess the advantages of reduced water consumption, high throughput, insensitivity to dirty conditions and can be built in all materials such as steel, with or without coatings, stainless steel, aluminium, etc.

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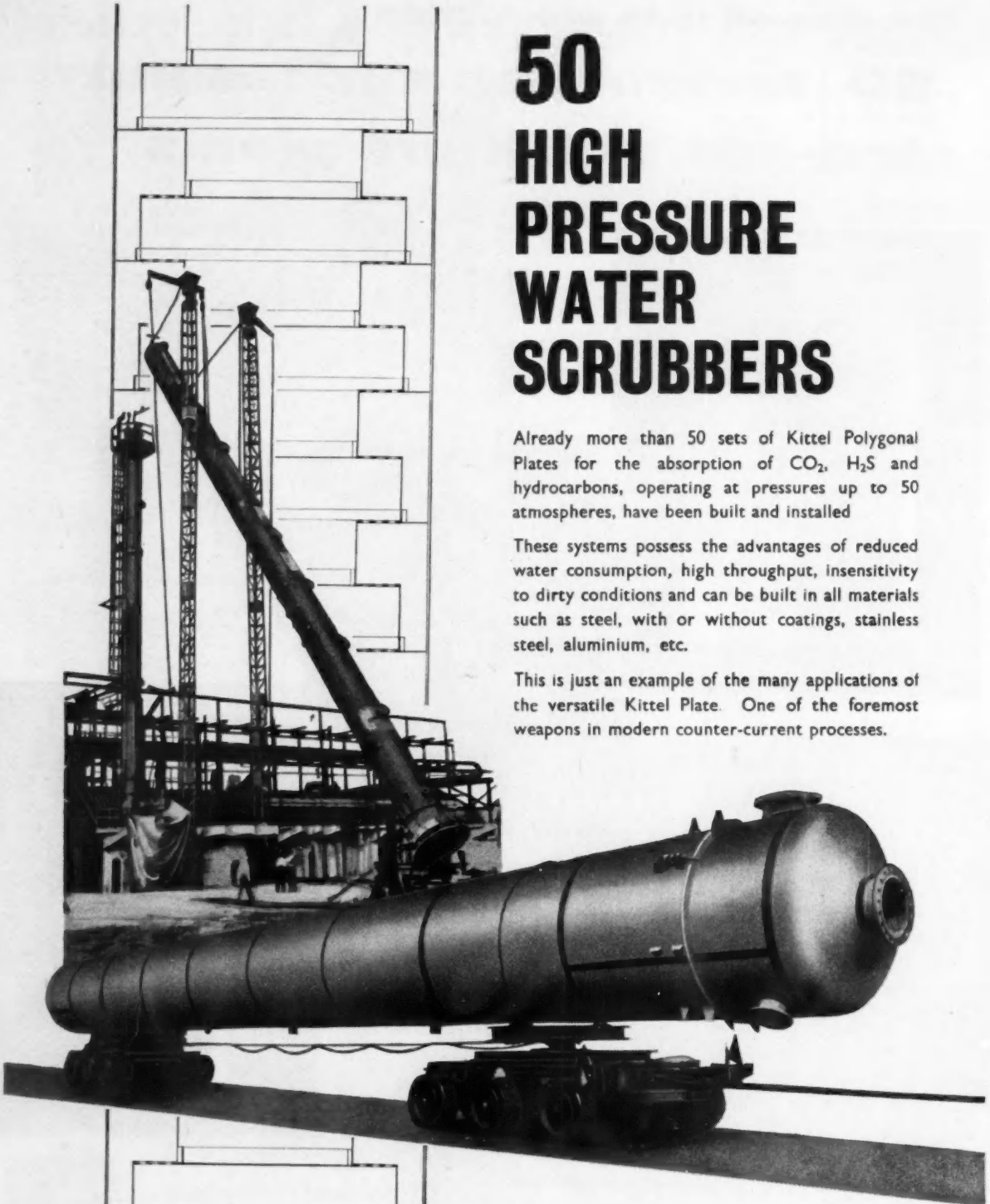

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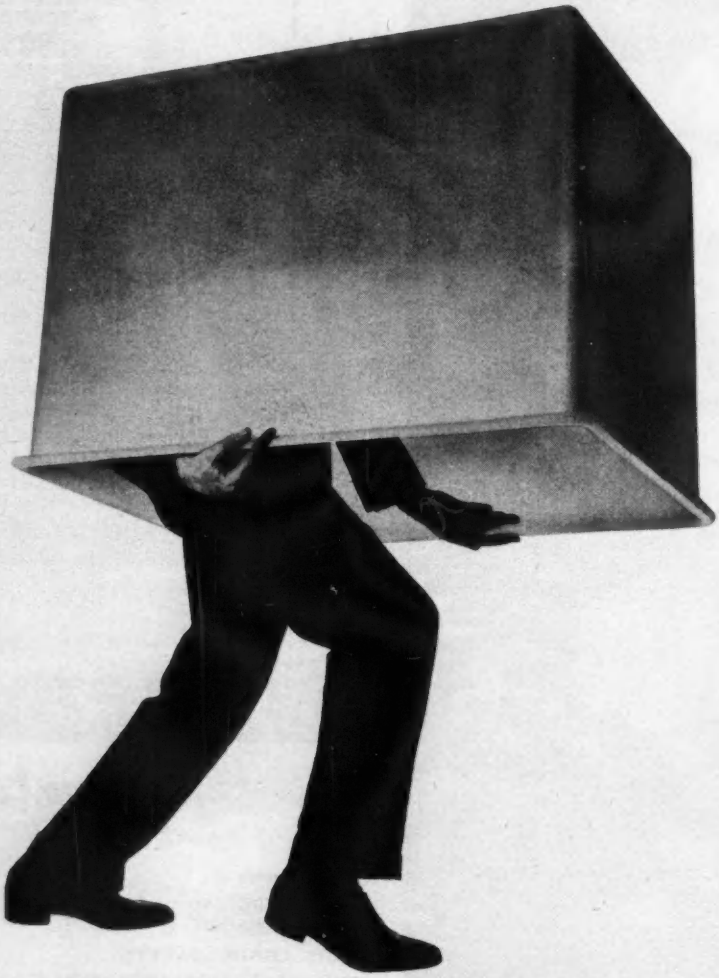
One of the reasons why we make such fine tanks and bins for the chemical industry is that we are chemists ourselves. The rigid polythene containers we make are excellent for storing, stacking, and carrying chemicals of many kinds ; they won't corrode or rust, are light in weight, and possess great impact strength. They're stable over a wide temperature range. Sizes ? 9, 12, 32, 36, and 80 gallon tanks, and 10, 16, and 20 gallon bins, with lids.



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They are low-priced because they are made from primary or secondary amines produced by the Armour patented continuous process.

Obtain your copy of the NEW 16-page Arquads booklet now.
It is packed with factual information on the use of Arquads in the textile, laundry, plastics, sanitizing, flotation, rubber, road emulsion, soil stabilization, and petroleum industries; it gives formulæ for their use as corrosion inhibitors, metal cleaners, car polishes, insecticide emulsion, etc.

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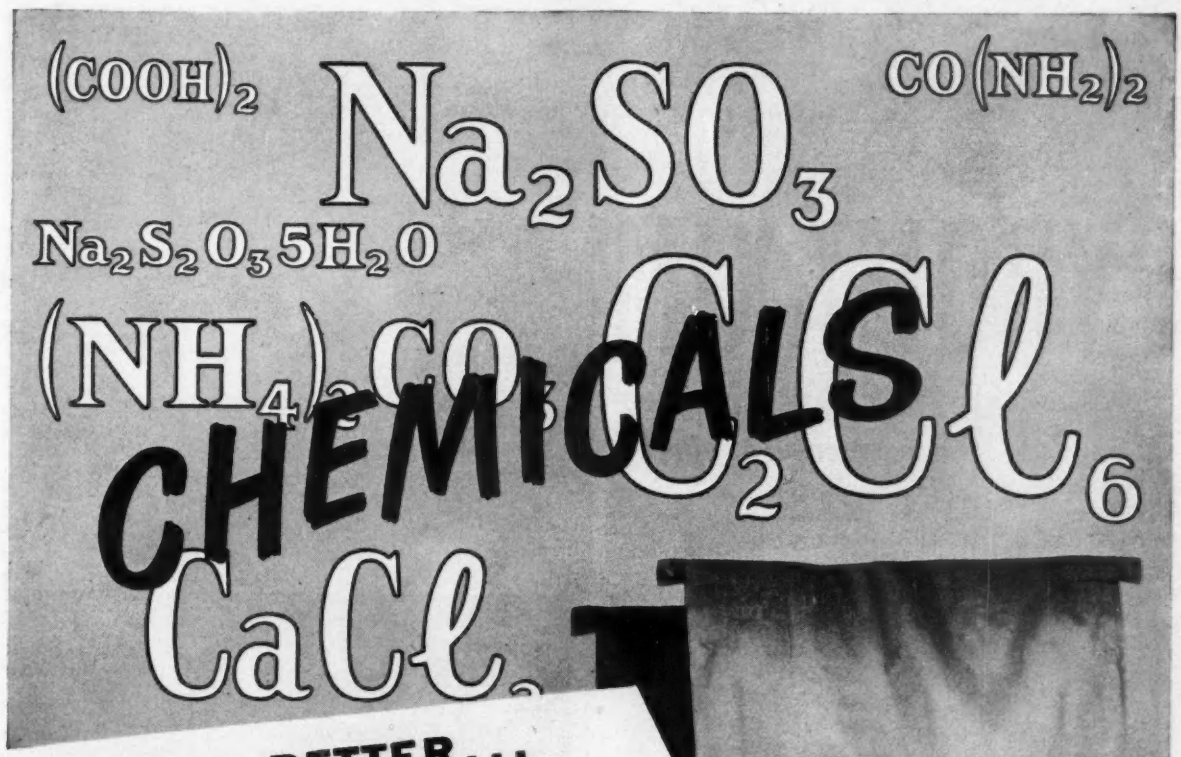

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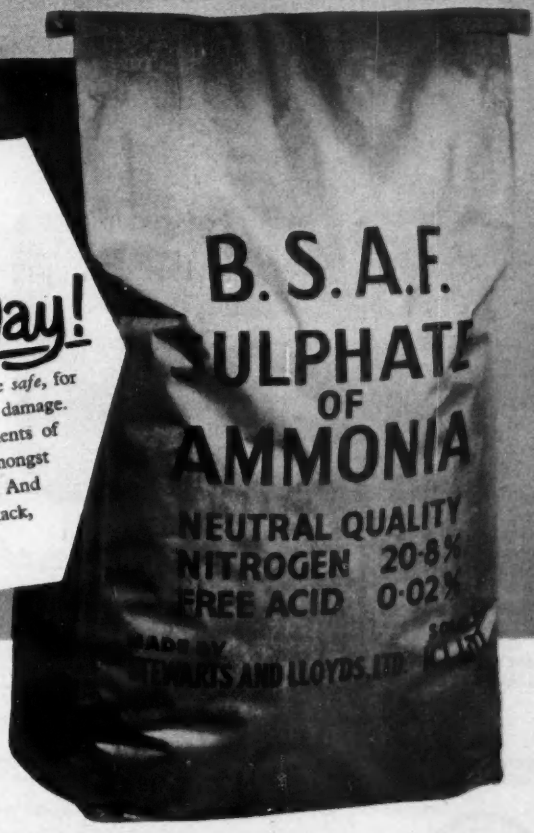
The PALFSACK way. Chemical products packed in PALFSACKS are immune to risk of contamination from without or to seepage from within. In transit and in store, the contents are *safe*, for PALFSACKS are immensely strong and highly resistant to physical damage. They can, moreover, be tailored to the particular requirements of particular chemicals by the use of special inside plies, amongst them being linings of polythene, wax, bitumen and silicone. And PALFSACKS are at all times easy to handle and easy to stack, whether their contents be solids or powders.



PALFSACKS could help *YOU*
to overcome packing problems—and we should welcome an opportunity to show you *how*.

Not just paper sacks—but

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make the

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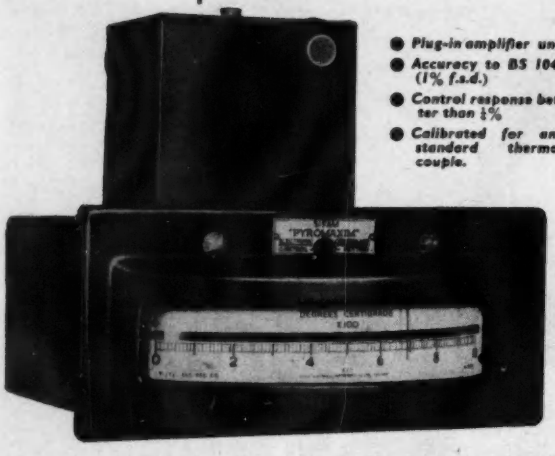
the Heart of your temperature control

8 inch Scale *simplifies readings*

The Pyromaxim has been designed for economy accuracy and long-term reliability



- *Plug-in amplifier unit*
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- *Control response better than ½%*
- *Calibrated for any standard thermocouple.*

The Sifam Pyromaxim Electronic on/off Controller combines sound design and skilled workmanship with proved principles of construction. Attractively housed in a robust steel case, which can be either flush—or wall-mounted, the Pyromaxim offers a completely reliable means of close temperature control under the most arduous working conditions.

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- *Motorised Gas or Oil valves*
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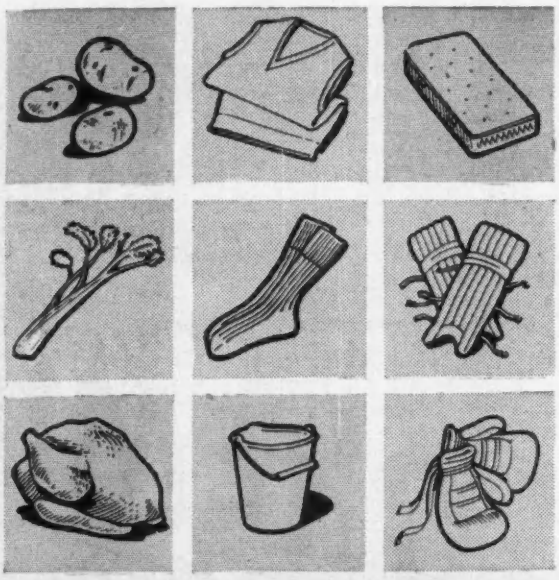
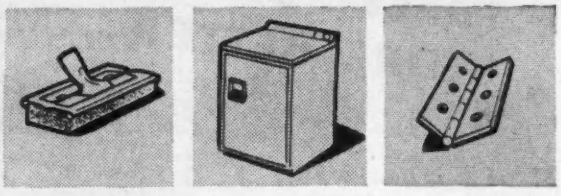


Pack your product in
'Spescopaks'



—for faster sales and larger profits

'Spescopaks' are made from high-clarity 'Visqueen' polythene film. That means they are not only economical, but tough, flexible, waterproof and hygienic.

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Let Spesco create an individual pack for your product

Write now for samples and quotations to
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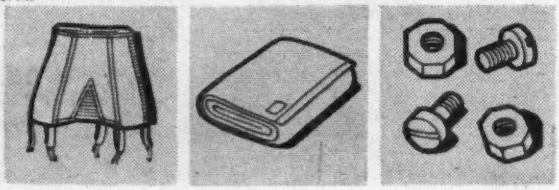
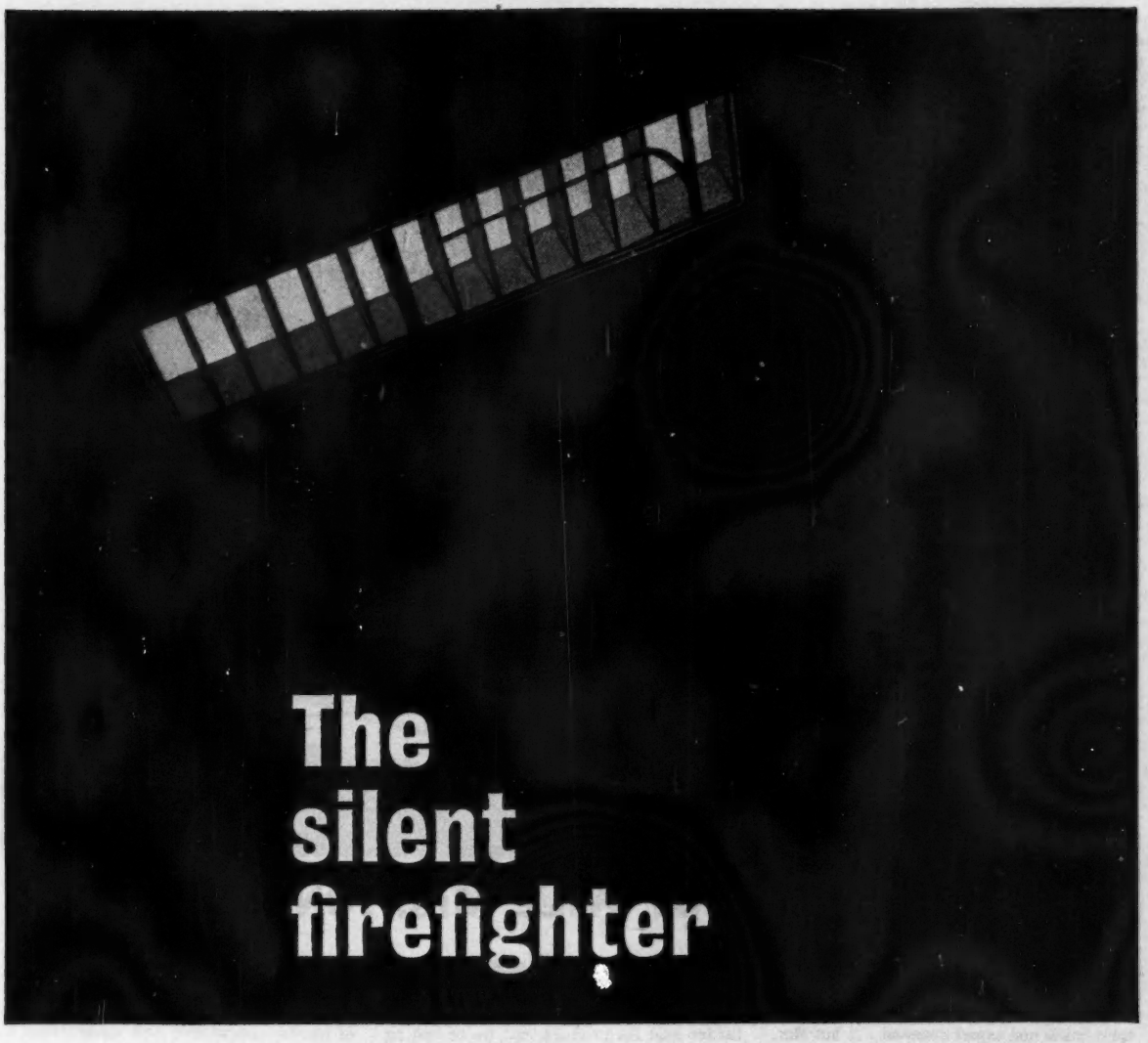
SP149





The silent firefighter

This fire ventilator saved a plant worth £3,500,000

It could well save yours

As any fire chief will tell you, fire in an unventilated area quickly produces choking, superheated smoke and fumes—conditions which keep firefighters out of the building and make effective firefighting virtually impossible. Perforation of the roof is the only remedy, but this is a hazardous operation which often endangers the life of the fireman.

The Colt Dual Purpose Ventilator has a special device that's acutely sensitive to heat. It opens *automatically* at a pre-determined temperature, releasing smoke, heat and fumes, keeping the fire localised. Firemen can enter the building, find the seat of the fire and extinguish it—with minimum damage to plant and equipment.

Colt dual-purpose ventilators have the added advantage that under manual control they can be used for normal plant ventilation and provide excellent day-to-day working conditions.

Widespread adoption by industry is proof of managerial faith in the silent firefighter.

COLT ***Dual-Purpose* Ventilators**

Automatic Fire protection—day-to-day controlled ventilation

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...BUT WILL Mrs. JONES LIKE IT?

The Glass Container-Acceptance Testing service will make sure

At last! The new pack is agreed. Around the table heads nod expert approval . . . but Mrs. Jones (average housewife) does not nod her head — she is not at the meeting. A pity! Because Mrs. Jones, A.H., is the ultimate, infallible authority on pack design. If she gives it the nod, it's right — if she doesn't, it's wrong.

How sensible then to cut out some of the guesswork by calling Mrs. Jones into consultation. You can do this very easily now, and it costs you nothing. Britain's Glass Manufacturers have set up the Container-acceptance Testing Service for the specific purpose of providing Packers with facilities to test consumer reaction to new packs *before* they go into mass production. Designs can be tested in any or all of the following four progressive stages.

1 Design Preference Testing. Any new design can be tested on a consumer panel of 400 households. Their preferences will be analysed and presented to the Packer as a report and recommendation.

2 Container in Use Testing. The new container and its product can be tested in actual use in the home. The panel's experience of the new pack will be recorded, analysed and furnished as a report.

3 Shelf Testing. The sales appeal of a new pack can be tested in self-service or other stores and the speed and volume of off-take audited and analysed by type of shop and locality. The pack may be tested either alone or against any alternative.

4 Area Test Marketing. Facilities are available for area test marketing any new product. An expertly staffed marketing service has been established which will plan, organise and, if desired, execute test marketing campaigns in their entirety for Packers launching new glass packed products.

Free Service. Because the Glass Manufacturers believe that these services should be used as widely as possible, all the facilities under headings 1, 2 and 3 are offered *free* as a service to the packing industry. The only cost to the Packer under these headings will be in the supply of goods, containers and such items as labels and transport. In the case of Area Test Marketing schemes however, a nominal charge will be made for planning the operation.

Security. Where any of these tests are carried out on new products, the whole operation can be executed with absolute security. Packers can have complete anonymity by employing one of the several brand names that have been registered especially for this purpose.

If you would care to have further details of this service, please do not hesitate to ask, irrespective of whether your interest is immediate or not. Details of this scheme have been published as a booklet, copies of which are available on request from your Glass Manufacturer or from the Federation.

SEE HOW GOOD THINGS ARE IN GLASS

THIS IS AN ADVERTISEMENT OF THE GLASS MANUFACTURERS' FEDERATION
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VOL. 84 No. 2139
JULY 9 1960

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CHEMICAL AGE

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IN THIS ISSUE

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C

U.K. — U.S. TRADE

WITH British exports of chemicals in the first five months running at the record annual rate of £322.8 million, nearly £30 million up on 1959, itself a record year, attention has recently been focused on U.K. trade with the U.S. U.S. exports of all goods to this country have been rising at a phenomenal rate while our exports to the U.S. have only risen marginally by comparison.

All U.K. exports to the U.S. for the five months of 1960 totalled £161 million, a 9.1% increase on the 1959 figure of £147.5 million. On the other hand total U.S. imports to this country in the first five months of 1960 were valued at £210.3 million, an increase of 58% over 1959. During May U.K. imports from the U.S. were higher by 95.6% compared with May 1959. In the first five months of 1959, the U.K. had a favourable balance in trade with the U.S. worth £14.7 million; in the first five months of this year, there was an adverse balance of £49.3 million.

The following table shows the trend of Britain's chemical trade with the U.S. in the first five months of this year:

U.K.-U.S. TRADE IN CHEMICALS

	January to May 1959	January to May 1960	% Increase
	£ million		
Imports from U.S.	11.9	20.8	74.8
Total imports	51.2	73.7	43.9
Exports to U.S.	4.7	4.9	4.4
Total exports	119.6	135.5	12.4

It was the big increase in total imports from the U.S. at a time when our exports to that country were increasing at a slow but steady rate that led Lord Rootes, chairman of the Dollar Exports Council, last week to point to the acute balance of payments problem facing Britain. The Government is alive to this particular difficulty, but asked Lord Rootes, did the Government realise the vast problems that Britain had to face in world trading?

Mr. S. P. Chambers, I.C.I. chairman, also referred last week to the drive by U.S. manufacturers to expand their export markets, when speaking at a lunch of the English-Speaking Union. Mr. Chambers was particularly concerned with the effect that this U.S. drive might have on Britain's traditional markets.

U.S. producers have an internal market that is large and prosperous and only a relatively small proportion of their output has to be sold overseas. It is thus much easier for the U.S. producer to bring down export prices to marginal levels. There is, according to Mr. Chambers, likely to be much greater pressure from U.S. companies than from their British counterparts to depress prices in third markets, such as South Africa, below the point at which production could be sustained profitably for that market by itself

This is one aspect of Anglo-U.S. trade relations that is likely to cause resentment in British industry. It is also clear, at least so far as the chemical industry is concerned, that U.S. companies, which because of their vast home markets, can build much larger and more economic units than their counterparts in this country, are beginning to make special drives on export markets in certain commodities.

One such chemical is *o*-xylene. As noted in CHEMICAL AGE, 5 March, p. 396, Cosden Petroleum, controlled by W. R. Grace and Co., are to raise their *o*-xylene capacity from 10 million lb./year to 80 million lb. by early 1961. The company has stated that the bulk of the increased output, is, like the present output destined for overseas markets, particularly Europe. The new *o*-xylene units have been designed so as to permit Cosden to double their new capacity to 140 million lb. a year. At present the product is 99% *o*-xylene; when the new material becomes available it will be in excess of 95% ortho.

Cosden see a big outlet in Europe for *o*-xylene as a replacement for shrinking supplies of naphthalene as a raw material for phthalic anhydride. The current world shortage for naphthalene and its derived materials, such as phthalic, and the demand for maleic anhydride have been responsible for increases in imports from the U.S. for these materials.

Imports of other U.S. chemicals that have increased in the past few months have included products such as ethylene glycol, toluene diisocyanates, polyester resins, and melamine moulding powders. There have also been increases in our imports from the U.S. of high purity silicon and dyestuffs, and a wide range of other chemicals and plastics raw materials. It should be stressed that in many cases increased imports reflect temporary shortages of raw materials in this country and that these higher import figures are not likely to be sustained in the long run.

MORE ETHYLENE FOR U.K. PROJECTS

ETHYLENE maintains its place as the primary petrochemical building block in the U.K., with the start up of the third olefin unit of British Hydrocarbon Chemicals at Grangemouth (see p. 57). U.K. production of ethylene at the beginning of this year was 300,000 tons a year, by the end of the year it will top the 400,000 ton mark, for in addition to the new B.H.C. capacity of 70,000 tons, I.C.I. are currently modifying their three olefin plants at Wilton to raise the capacity by at least 20% from the current total of 110,000 tons, to give a figure of 135-140,000 tons.

Next year U.K. ethylene production will be further boosted by the £5.5 million extension to the Esso petrochemical plant at Fawley, which is being constructed for Foster Wheeler to supply I.C.I.'s ethylene oxide and ethylene glycol plants at Severnside. I.C.I. will then have available some 180,000 tons a year. Last year British Celanese completed the 40% expansion of their olefin plant at Spondon which supplies ethylene for ethanol and propylene for isopropanol.

Major feedstock for ethylene in the U.K. is naphtha, which is estimated to account for 94% of ethylene capacity. Shell at Stanlow are the only U.K. producers to use a feedstock other than naphtha, using propane and a certain amount of refinery gas.

At the beginning of this year, 41% of U.K. ethylene capacity, or 130,000 tons, was being used for polythene, 18% (65,000 tons) for ethylene oxide, 34% (100,000 tons) for ethanol, 5% for styrene and 2% for anti-knock compounds. There are likely to be some changes in this picture by the end of 1962. The new B.H.C. extension is now enabling the Grangemouth ethylene-consuming plants to operate at full capacity and will also supply the second polythene plant which, with a capacity of about 13,500 tons a year, Union Carbide are putting into operation this year at a neighbouring site.

Apart from the 35,000 tons a year of ethylene oxide, ethylene glycol and derivatives that I.C.I. plan to have in production at Severnside by 1962, Union Carbide's Hythe plant came on stream in February with a production of 20,000 tons/year of ethylene oxide and derivatives, while Shell Chemical's new direct oxidation ethylene oxide plant has a 25,000 tons/year capacity.

Among the smaller outlets for ethylene in vinyl chloride and in this field I.C.I. are next year raising their p.v.c. output by 10,000 tons/year to 80,000 tons. British Geon will next year complete the eighth extension to their Barry p.v.c. plant. Shell Chemical's 18,000 tons/year styrene monomer plant is complete at Carrington and should be on stream by now.

CORONENE FROM ANTHRACITE

CORONENE, a rare chemical used by the Germans during the Second World War as a base for dyestuffs, has been produced during the conversion of certain American coals to pipeline gas. The coronene, recovered by chemists in the Bureau of Mines' research laboratories at Bruceton, near Pittsburgh, is extremely pure and has been described as a hydrocarbon consisting of a ring or crown of six benzene rings. With an exceptionally high melting point for a hydrocarbon, it is quite stable and relatively inert.

One of the significant features of the recovery of coronene is the fact that it was found only during the processing of anthracite; bituminous coal or char did not yield the chemical. Previously coronene has been obtained only by complicated processes, mainly the hydrogenation of coal into liquid fuels, but coronene had never been detected in American coals. The characteristic needle-like crystals were discovered by the Bureau's chemists while using a simpler hydrogenation technique for making pipeline gas from coal during tests on powdered anthracite.

The recovery of coronene from Pennsylvania anthracite has been at a rate of 1 lb. per 1,000 lb. of coal. Since coronene has never been used commercially in the U.S. and because the market cost of $2 to $3 a lb. places it in an unfavourable competitive position with other dyestuff bases, there is no potential outlet in the next few years. There is no doubt that coronene could help underwrite the cost of gasification should the production of pipeline gas from anthracite become commercially feasible.

During the war, coronene was produced in Germany as a by-product from the complex plants built to make synthetic gasoline and other liquid fuels from coal. Destruction of many of the German synthetic fuel plants during the war, the failure to rebuild them and the abandonment of remaining plants following the return to peacetime imports of petroleum, ended production there.

I.C.I. Billingham Chairman Reveals Big Leap Forward in Nitrogenous Fertilisers

A FURTHER big demand for fertilisers next year was anticipated by Mr. W. J. V. Ward, chairman of the Billingham Division of Imperial Chemical Industries Ltd., when he addressed members of the ammonia section at a dinner to celebrate their production and safety achievements in 1959. After mentioning high and steadily rising demands for Ammonia Works products from other Divisions of I.C.I. and from other industries, Mr. Ward said that much of the ammonia produced was needed for fertilisers and added: "Fertilisers form about 60% of our business, and I am pleased to say that this year there is again a high demand for them. The farmers have taken quite a big leap forward in their buying of nitrogenous fertilisers".

Mr. Ward revealed that the Division was planning new plants for increasing its gas-making capacity and that this would make possible an increase in fertiliser manufacturing capacity. There was to be a new plant at Severnside which would make initially 100,000 tons a year of ammonia for turning into fertilisers and other products. The fertilisers would be mainly for the southern market but with the big demands existing throughout the country he did not think there would be any reduction in output at Billingham.

Mr. Ward paid tribute to the recovery made in ammonia production after the failure of two compressors in the latter part of 1958. He also referred to the use that had been made of the oil gasification section compressors in achieving outputs which from time to time had reached more than 1,000 tons/day. The oil gasification plant had been using oxygen for a month or two, but "plans for building a new and better oxygen plant of our own are under way".

Treated Plywood Resists Chromic Acid and Lime

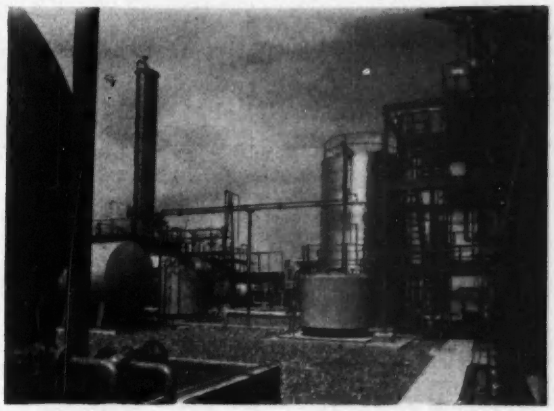
A RESIN-IMPREGNATED, waterproof plywood has solved a longstanding problem in the Randak tanning plant of R. and A. Kohnstamm Ltd., Beckenham. Forming the access doors of large tanning drums, the plywood is successfully resisting chromic acid, lime and chemical dye solutions that have rapidly eroded timber and metal.

The doors are a new and unusual use for Permaply, the resin-impregnated plywood made in this country by Venesta Plywood Ltd., Vintry House, Queen Street Place, London E.C.4. They are formed by Permaply sheet framed in gunmetal and secured by stainless steel bolts; solid brass fixings originally tried corroded and soon became useless. Dimensions are 27½ in. by 18 in.

The inner surface of the doors is submerged almost continuously. Under this treatment, wooden doors quickly began to swell, warp in their frames, and finally split. The chemically-treated Permaply has remained flat and unbroken (without maintenance) after nearly a year's exposure to the most extreme conditions.

Project News

DOWPON PLANT COMPLETED TWO MONTHS AHEAD OF SCHEDULE



Tank farm at Dow Agrochemicals' King's Lynn plant

COMPLETION of the £1 million plant of Dow Agrochemicals Ltd., at King's Lynn, Norfolk, has been achieved two months ahead of schedule. The plant will produce Dowpon systemic selective grass weed killer, hitherto imported, and represents the first stage in a project planned to become one of the largest agricultural chemical factories in Europe. Construction of the plant, which stands on an 80-acre site, began in July 1959, the contractors being Constructors John Brown Ltd., while the architectural design was by Mr. E. Maxwell Fry, F.R.I.B.A. The Dowpon plant is the British version of the Dow plant in the U.S.; the British design was supervised by Mr. J. W. Warbourg, chief engineer to Dow Agrochemicals.

With the start of production at King's Lynn, Dow Agrochemicals have announced price reductions to take immediate effect. These amount to nearly 20% overall, but are graduated according to the quantity purchased. Other products to be manufactured at the new factory in the near future are Etrolene anti-warble fly drug, Zoamix (a coccidiostat) and Nankor non-toxic fly killer.

Fisons Start £1m. Fertiliser Factory Extension

● STEPPING up of phosphoric acid production, the manufacture of ammonium phosphate for the first time and the speeding up of raw materials handling will result from £1 million extensions and modifications which Fisons Fertilizers Ltd. now have in hand for their Immingham (Lincs) factory—one of Britain's largest fertiliser factories.

Phosphoric acid output will increase from June 1961, as a result of the factory extension, design and engineering of which is being handled by Fisons' engineering and technical section, subcontractors being employed where necessary. Ammonium phosphate manufacture will follow modifications to a plant now producing triple superphosphate. It will be distributed to Fisons' fertiliser plants in the U.K. for the manufactture of high analysis compounds.

Quayside operations at Immingham will also be speeded up and the rate of turn-round of shipping increased by the installation of additional cranage and modifications to the raw material intake system. Storage for phosphate rock will also be increased.

These developments follow little more than a year after the opening of Fisons ammonium nitrate factory on the Thames Estuary at Stanford-le-Hope, which was built as part of a £4¼ million scheme.

● As part of an expansion programme designed to meet the rapidly increasing demand for their flexible polyurethane foams, Aeropreen Products Ltd., High Wycombe, Bucks, are to increase their factory space by 25% with a corresponding increase in cutting plant. Laboratory facilities are also being extended.

● CONTRACT for a 7,000 gall./hr. lime-soda plant, valued at £8,500, for the Distillers Company's Cameronbridge Distillery, Windygates, Fife, has been awarded to William Boby and Co. Ltd., water treatment engineers of Rickmansworth, Herts.

● TENDERS for an £A12 million oil refinery to be built a few miles south of Adelaide will be called in a few weeks. Work on the project will begin by the end of this year and the refinery is due on stream in the second half of 1962. Mr. W. A. Williams, manufacturing director of Vacuum Oil, has conferred with the heads of South Australian Departments associated with the refinery project.

★ ALTHOUGH attendance of the annual meeting this week in Bristol of the Society of Chemical Industry, was well below the 500-600 level hoped for, the meeting started on Tuesday with a most interesting survey of the evaluation of the world's chemical industry (see p. 59) by Mr. E. J. Solvay of Solvay et Cie.

In his paper, he recalled the memorable meeting in the bar of the *Aquitania* in the 1920's between Sir Harry McGowan, Sir Alfred Mond, Mr. Solvay and other Solvay colleagues. This took place shortly after the big German merger that led to the formation of I.G. Farben. Talk came round to this trend and an agreement was signed on the ship's notepaper forming Imperial Chemical Industries Ltd. Letters on the same notepaper went to the various companies. So I.C.I. was born.

Changes in the officers included the election of Dr. John Ferguson, I.C.I.'s main board research director, as hon. treasurer to succeed Dr. Hughes, who was congratulated on his successful efforts in a difficult position, and also of Sir Harry Melville, D.S.I.R. secretary, and Dr. F. Roffey, as members of the council.

★ CUBA'S take over of three refineries belonging to Royal Dutch/Shell, Standard Oil of New Jersey and Texaco was clearly political, while the companies' refusal to handle Soviet crude oil was based on commercial grounds. As Shell have pointed out their Cuban refinery is dependent on Venezuelan oil and that to make any change in this arrangement would harm the economy of Venezuela. The South American Shell company, which had received no payments for its oil since May 1959, refused to supply any more oil to the Cuban refinery.

Presumably all three refineries were designed to refine Venezuelan crude oil, which has a low sulphur content. If the Cuban authorities are successful in obtaining bulk supplies of Soviet oil—which is notable for its high sulphur content—then in the long run and in the absence of desulphurisation, much damage could be done to the existing installations.

★ IT HAS taken 20 years of research for chemists to find a means of synthesising chlorophyll. This important step, however, has now been achieved by both German and American chemists; by Prof. Martin Strell and his assistant, Dr. Anton Kalojanoff of the Institute for Organic Chemistry at Munich Academy and, three months later, by Mr. R. B. Woodward of Cambridge, Mass. News of their achievement was given last week in an information bulletin issued by the Association of the German Chemical Industry. The Association pointed out the far-reaching significance of this development and believe it may eventually lead to the synthetic production of carbohydrates, fats and vitamins for food. While this conjecture may be a little optimistic, the synthesis of this important compound is, nevertheless, a big step forward in the synthetic production of naturally occurring materials.

★ THE Government has initiated 'an enquiry' into the general problem of pipeline development and the procedures which should be followed in future cases. This was stated by Mr. R. Wood, Minister of Power, when the Esso Petroleum Bill had its second reading last week in the Commons. When this examination is complete, Mr. Wood will make a further statement.

Esso's Bill is likely to have a speedy passage now in view of the importance the Government attach to the project to build pipelines from Fawley to London Airport and from Fawley to Avonmouth to supply ethylene to I.C.I.'s proposed ethylene oxide and ethylene glycol plants on Severnside. Mr. Wood said it seemed that this plant would be one of the most important industrial developments in the immediate future. Mr. R. Maudling, president, Board of Trade, is satisfied that if economics that will accrue to I.C.I. through the use of the pipeline will make an appreciable difference to their export potential.

Pipeline work in this country is in its infancy and further developments can be expected in the future. In the U.S. there are about 250,000 miles of fuel pipeline and these are being laid throughout the Common Market countries linking chemical and other works to refinery and natural gas sources.

★ FIRST report I have seen of Soviet papers describing work on the introduction of metallic and other inorganic elements into polymer molecules, presented at the recent Moscow symposium on macromolecular chemistry, came from Mr. Albert Hester, European manager of the American Chemical Society and appears in the A.C.S. *Chemical and Engineering News* (27 June, p. 21). Several metals have been introduced into side chains of various types of polymers, although attempts to do the same with the backbone chain itself have been largely unsuccessful.

Among the work reported by Hester is the introduction into side chains of germanium by S. L. Davidova *et al.*, who made methacryltriethylgermanium from triethylgermanium bromide and methacrylic acid. In turn this was co-polymerised with methylmethacrylate or with styrene. The germanium compound also forms a polymer, but its softening temperature is less than 200°C.

Other work includes the polymerisation of organic tin compounds and trialkyl or triaryl stanylmethacrylates and related compounds to give strong transparent polymers and copolymers that are effective barriers to X-rays. A number of lead- and mercury-containing polymers, including polymers of *p*-phenylmercurostyrene and *p*-styrenephenyllead and *p*-styrenetriphenyltin have also been produced. Percyanoethylene, which seems to form a chelate in which metal atoms on the surface of a piece of metal combine in a complex molecule containing carbon and nitrogen has been used to make an unusual sheet of polymer. The resulting coating of polymer on the metal can withstand temperatures up to 500°C. Such polymers might be used for semiconductors.

★ THE slogan 'On tap but not on tap', which stems from the argument that knowledge of the material world does not give the scientist the kind of wisdom necessary to manage affairs, is pure nonsense. The belief, held in a wild disregard of logic, that men of science are necessarily unfitted to be in control, is shattered in typical style by Sir Cyril Hinshelwood, O.M., president of the Royal Society, in the latest issue of the aptly-named *Catalyst*, published by the Shell Chemical Co.

It can equally well be said that in no field at all is mere knowledge sufficient to make the wise man, wisdom being a product of inborn qualities and experience of living. A specialised application of that principle to decry scientific knowledge is sheer prejudice. Proper qualifications for the direction of affairs or enterprise of any kind constitute a complex combination of energy, wisdom and other elements of temperament and character.

As Sir Cyril points out, some men of science possess these, others do not, just as some soldiers, sailors, politicians, clergymen, historians, doctors and trade union leaders possess them and others lack them. He also points out that shows the danger of keeping scientists in a subordinate rank—the better ones will keep out and what the 'tap' delivers will be pretty flat and second rate. If major decisions are all to be made on the basis of second-hand knowledge, the function of the higher direction ceases to be creative, it becomes purely critical and will neither initiate nor inspire.

Alembic

U.K.A.E.A. to Build New Zero Energy Reactor

THE United Kingdom Atomic Energy Authority have decided to build a zero energy fast reactor at the Atomic Energy Establishment, Winfrith. The reactor has been named 'Zebra' (Zero Energy Breeder Reactor Assembly). The reactor has been designed to permit the study of the neutron physics of a wide variety of fuel assemblies containing uranium and plutonium. The assemblies under study will be built up by loading fuel elements into a steel matrix (approximately a cube of side 10 ft.). The fuel elements contain both fuel plates and plates of neutron-absorbing material: the latter will be used to simulate the nuclear properties of the coolant and structure material which would be required in a power reactor. 'Zebra' will be operated at room temperature and the heat output from the nuclear reactions in the core will be kept very low so that no cooling system is necessary. It is planned to commission the reactor during 1962.

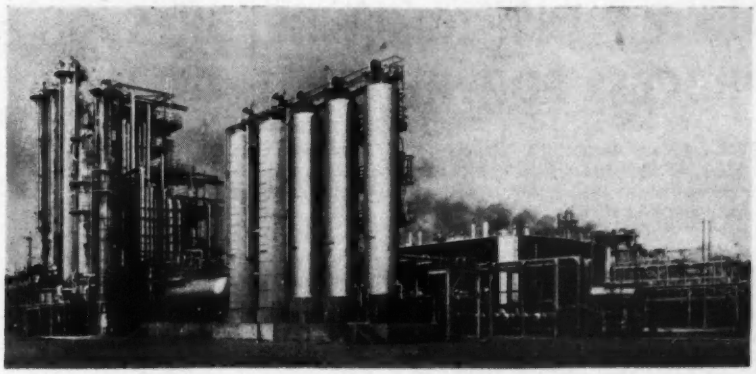
'Zebra' will be used to obtain information that will be needed for the design of a prototype which is likely to be the next step in the development of the fast reactor by the Authority. The work at the A.E.E. Winfrith will complement that carried out at the Dounreay Reactor Establishment.

I.C.I. Plastics in Russia —Next Stop, Leningrad

FOLLOWING its very successful showing in Moscow in June, one of the highlights of which was an unexpected visit from Mr. Kruschev, I.C.I. Plastics Division's 'plastics in industry' exhibition opens in Leningrad on 15 July from 15-29 July. Included in the exhibits are a motor boat made from Alkathene polythene, an Austin 7 saloon car showing the uses of I.C.I. plastics in the motor car industry, sections of a bathroom and kitchen featuring Perspex sanitary ware, and p.v.c. flooring, large rigid p.v.c. tubing and p.v.c conveyor belting for foodstuffs and coal.

I.C.I. is already selling polythene and p.v.c. in Russia and hopes that the exhibition will stimulate trade in these and in new plastics materials. Technical officers from Plastics Division will deliver a series of lectures on materials and fabrication methods. There will also be a working demonstration of machinery employed in the plastics industry. Injection moulding and extrusion machines built by R. H. Windsor Ltd. will produce finished articles using I.C.I. plastics materials.

In Moscow, Mr. Kruschev visited the exhibition with members of the Central Committee of the Praesidium on the day before the exhibition's official opening. This unexpected visit indicated a high degree af official approval and as a result the exhibition received full support from all the various Government committees and institutions. A great volume of literature was available, all of it translated into Russian, and some 7½ tons was shipped to Moscow for distribution.



View of the new B.H.C. ethylene plant from the south east

THIRD B.H.C. OLEFIN PLANT RAISES CAPACITY TO 130,000 TONS/YEAR

THIRD ethylene plant of British Hydrocarbon Chemicals Ltd. with a capacity of 70,000 tons a year, has been erected ahead of schedule and the plant is already on stream at Grangemouth. Main contractors were Stone and Webster Engineering Ltd., whose process is employed.

The new unit more than doubles existing capacity, bringing it to a total of 130,000 tons a year; each of the two previous olefin plants—in production since 1951 and 1956—has a 30,000 tons/year capacity. The new plant, erected at a cost of about £6 million, is the largest of its kind outside the U.S.

The new plant is linked by underground lines with the existing olefin units on the other side of the Bo'ness Road which runs through the B.H.C. petrochemical site.

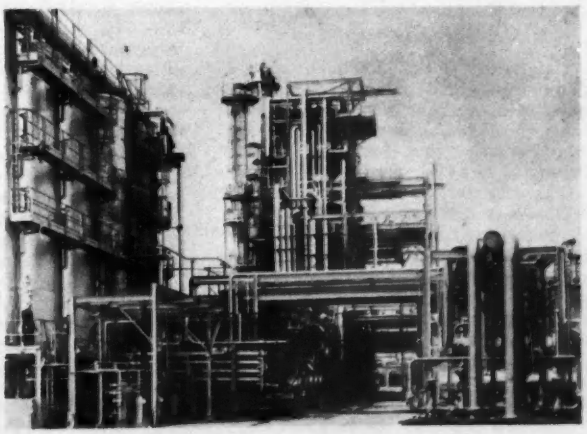
Apart from enabling existing ethylene utilisation plants at Grangemouth and the new Rigidex plant to be used to full capacity, the new unit has made possible the company's recently announced plans to double its capacity for butadiene, and to build new plants for methanol and ethylene dichloride (CHEMICAL AGE, 26 March, p. 529 and 9 April, p. 601).

In the 10 years since the Grangemouth petrochemical complex was initiated by this joint Distillers-British Petroleum company, investment has reached a total of over £30 million. Earlier this year the cumene-phenol plant worked up to its design rating. With a capacity of 13,000 tons of phenol a year, main contractors were Stone and Webster, the cumene unit being built to the specification of Scientific Design and the phenol-acetone unit engineered by S. and W. to D.C.L. design. Stone and Webster were also main contractors for the Rigidex plant which, using the Phillips low-pressure process, came on stream last year.

The three new plants now in hand at Grangemouth will raise investment there to between £35 and £40 million when they are completed during 1961. Chemico are designing, engineering and constructing the methanol unit, Fluor are handling the butadiene extension, while Lummus have the contract for the ethylene dichloride unit.

Associated Lead to Extend Zircon Refinery

Associated Lead Manufacturers Ltd are completing £75,000 extensions to their works at Willington Quay, Wallsend. The expansion is due to a large increase in the firm's zircon refining business during the past eight years.



Another view of the B.H.C. ethylene plant, from the east

ALKALI INSPECTOR REPORTS ON PROCESS FOR REMOVAL OF H_2S

THE Alkali Inspector's Report of 1959 for England and Wales (see also CHEMICAL AGE, 2 July, p. 17), states that where there had been complaints in connection with 'chemical manure works', the inspectors had in 1958 called for chimneys of not less than 120 ft. in height. Now that this has been complied with in the majority of cases for de-dusted, water scrubbed gases from the granulation of fertilisers, at one time responsible for considerable comment, complaint has almost died away, However, carry-over spray, of which a serious view is now being taken, has caused trouble. Ammonium nitrate has been used on a considerable scale, and it is claimed that this had led to decreased dust formations, but further figures are desirable.

The average of all tests on the waste gases from granulation plants gives an acidity of 0.16 gr. per cu. ft.

Nitric Acid. The average acidity of 1.72 gr. per cu. ft. calculated on sulphur trioxide, of the undiluted waste gases escaped to the air from the ammonia oxidation units based on the emissions from 15 stacks, is satisfactory but there is still occasional complaint against the appearance, the brown emissions being visible over a wide area. In this connection the two companies which have built units by the Thames Estuary have installed a catalytic combustion system whereby the coloured waste gases should be reduced to an almost colourless escape of low acidity. Results have so far been promising but further comment is postponed until next year when both plants will have been in operation long enough for the effect to be assessed.

Sulphate and Muriate of Ammonia and Gas Liquor. The number of registrations in this class continues to fall, largely due to concentration of gas and coke production at fewer and larger works and to the growth of the direct application of crude, weak liquor on the land as fertiliser. There have been a number of oral protests and minor criticisms concerning conditions, but nothing to warrant formal written protest.

High Standard

Chlorine. Once again, the high standard of the big works for the electrolytic production of chlorine and for the large scale use of chlorine in chemical processes has been maintained. Such adverse comments as there were related to smaller works, and even there have been due to the smell of the final or intermediate products rather than chlorine. Of such products the chlorinated phenols and the chlorinated lower fatty acids appear to give the most trouble. A minor use of chlorine which is beginning to give some concern is the "degassing" of aluminium by passing chlorine gas through the molten metal. The matter is being studied.

Chlorine emissions, due to a temporary plant failure, at a medium sized unit for chlorination, caused local alarm and a mistaken rumour of phosgene.

For chlorine wastes the target is complete elimination, although this is not always practicable. The usual technique is to scrub with caustic soda, but there is not always an outlet for the hypochlorite liquor produced. A more economically attractive process whereby the attenuated chlorine in the waste gases is actually recovered as chlorine gas has been in use since early 1959. The process, which is covered by a patent, consists essentially as of an absorption and stripping column, using carbon tetrachloride as the chlorine solvent. Tests on the vent to air at the operational plant have been satisfactory.

Smoke Problem

Muriatic Acid. The statutory requirements for muriatic are somewhat severe, gases escaping to the air not containing more than 0.2 gr. of hydrogen chloride per cu. ft. At one works inattention to make up the milk of lime scrubber dealing with tail gases led to an escape of 0.7 gr. of hydrogen chloride per cu. ft. The real problem of these works is smoke, which was listed as a noxious gas in 1956. The remedy being applied is mechanical stoking, and by the end of 1959, 64 operating pans had been fitted with mechanical stokers.

Sulphide. In many operations in sulphide works the already sufficiently offensive smell of hydrogen sulphide is enhanced by the malodorous organic sulphur compounds. This class of work needs and receives close attention. Complaints relating to an evil-smelling mercaptan type compound in the Midlands have almost completely disappeared due to the joint efforts of the inspectorate and industry.

A more attractive process for the removal of hydrogen sulphide than by scrubbing with caustic soda is dealt with relating to viscose rayon. The scrubbing is carried out by an alkaline liquor, containing hydrated ferric oxide in suspension. The scrubbing liquor is aerated so that the ferric sulphide formed by reaction of hydrogen sulphide with ferric oxide is regenerated to ferric oxide with the liberation of elemental sulphur, and the scrubbing medium ready for re-use.

Bisulphide of Carbon. 1959 saw the commissioning of a 170 ft. high plant using a fluidised active carbon bed technique, to recover some two-thirds of the carbon bisulphide contained in the exhaust gases from one of the production units at Courtaulds' Greenfield Works. Emissions from one works, mainly from Claus kiln units being used for the disposal of the by-product hydrogen sulphide, has caused a number of complaints. The Claus kiln units are being reconstructed, oil-fired combustion chambers being installed to ensure complete conversion of the sulphur compounds to sulphur dioxide.

Paraffin Oil. The throughput of crude and process oils was 36 million tons compared to with 2.5 million tons in 1938, nearly all of which was treated at seven big refineries. Complaints have been the lowest since the new refineries came into operation in the early 1950's. Perhaps the main feature of the year has been the interest aroused and the opposition to the proposal of Petrochemicals Ltd. to extend their steam raising capacity and to discharge the flue gases via a 300-ft. chimney. Local apprehension as to the effect of the increased sulphur pollution of the area led to an enquiry and it was decided that the minimum height of the chimney should be 375 ft.

Bromine. Of the 41 registrations, two relate to the production of bromine from sea water and the rest of the use of bromine in the chemical and allied industries. The technicological improvements mentioned last year have led to an increase in the production of bromine. Provision of automatic control has led to steadier plant operation and thus further reduced the hazard of emission of bromine vapour to the air. A further increase in bromine producing capacity is contemplated and should become effective in the summer of 1960. Major efforts are being made by the use of a new fume filtering material to further reduce emissions.

Gas and Coke. The fall in registrations from 477 to 454 is mainly due to policies of concentration operating in the gas and coke industries. Gas and coke works present some very difficult problems and are likely to do for some time. There has been further consultations with the Gas Council to deal with them. Horizontal retorts are being replaced by vertical ones which can be relatively smokeless.

The rate of installation and renewal of conventional carbonising plants has been appreciably slowed by the introduction of processes based on petroleum products, but further units were commissioned at the largest works operating the oil gasification process, the Isle of Grain works.

There has been an appreciable volume of complaints but some progress has been made in the way of improving grit arrestment on water gas plants, and in reducing dust and grit emissions from handling and screening of coke and unloading coal.

AMMONIA PRODUCTS (ENGLAND AND WALES)

	1959 Tons	1958 Tons	1957 Tons
Cone-ammonia liquor from by-product liquor calculated as 25% strength	114,200	116,900	113,600
By-product sulphate of ammonia	282,500	310,200	334,800
Synthetic sulphate of ammonia	906,700	879,700	849,300

Some of the concentrated liquor produced was converted to sulphate of ammonia included in the totals above.

TAR DISTILLED AND PITCH PRODUCED (ENGLAND AND WALES)

	1959 Tons	1958 Tons	1957 Tons
Total tar distilled to pitch or other residue	2,400,000	2,484,400	2,600,000
Pitch produced	1,008,900	1,039,000	1,059,700
Pitch oiled back	580,100	567,500	653,700

S.C.I. President Calls for Chemical Firms to Co-ordinate on Research

Presidential Address at Annual Meeting

THE view that with many chemical firms spending as much as 5% of turnover on research, the time had come when companies should co-ordinate their research programmes was expressed by Mr. E. J. Solvay (Solvay et Cie) in his presidential address at the S.C.I. annual meeting in Bristol on Tuesday. Already processes developed by one company were licensed to others.

The total cost of research, the expense of apparatus, the shortage of scientific staff were, he felt, beginning to act as a deterrent in some cases. That was not a good thing. The chemical industry must co-ordinate research if progress were to be made. Such co-ordination should not only be confined to joint programmes in one field in a single country, but must be extended at the international level. More than ever in history it was true today that science knew no national boundaries.

Several companies had already taken the first step in joint research, and this could only lead to a reduction in the amount of time and money wasted by duplication.

In the course of his address, Mr. Solvay looked back over his 50 years in the chemical industry, reviewing the many changes he had seen. With the theme of the evolution of chemical industry, he said that the first industrial production could be said to have started in 1746 with the production of sulphuric acid in Birmingham. He divided the last 200 years into three periods: 1750 to 1914, 1914 to 1948, and 1948 to the present.

In the first period chemistry was swept along by the industrial revolution; sulphuric acid and sodium carbonate were the chemicals on which nineteenth century progress depended. One of the most important discoveries of the period was that of synthetic dyestuffs by Perkin, which led to developments in other fields, including pharmaceuticals.

The first world war brought benefits to the chemical industries of all the belligerent countries. In Germany, for instance, cut off from Chilean nitrate, the Haber synthesis of ammonia process was put into production. The years after the first world war saw the formation of the chemical giants—I.G. Farben in Germany and I.C.I. in Britain. The second world war saw the first large-scale development of the synthetic rubber and petrochemical industries. Continental Europe's chemical industry was set back 10 years by the war. On the other hand, taking a base of 100 in 1938, by 1948 the U.S. chemical industry production had an index of 252; that of the U.K., 174.

In the years since 1948 there had been a phenomenal growth in the world's chemical industry. General U.S. industrial production had risen 40% between 1948 and 1959; in the same period, U.S. chemical production had risen by 68%. Between 1948 and 1959 industrial production in the O.E.E.C. area had been doubled, chemical production had, however, increased threefold.

This more rapid growth of the chemical industry, compared with general industry, was an outstanding feature of the industry, with many firms spending as much as 5% of turnover on research.

S.C.I. Annual Meeting Reveals 11% Fall in Membership Since 1952

SEVENTY-EIGHTH annual meeting of the Society of Chemical Industry held in Bristol this week was attended by about 350 members and their ladies. Following a welcome by the Lord Mayor of Bristol on Tuesday, Sir Alexander Fleck, F.R.S., former chairman of Imperial Chemical Industries Ltd., was elected president for 1960-61 in succession to Mr. Ernest J. Solvay (Solvay et Cie).

Other officers elected were: hon. treasurer, Dr. John Ferguson (I.C.I. research director); hon. foreign secretary, E. L. Streatfield (Houseman and Thompson Ltd.); hon. secretary for foreign affairs, Dr. H. K. Cameron (General Electric Co., Erith); hon. publications secretary, Professor W. G. Overend (Birkbeck College, London); past-presidents on the council, E. J. Solvay, H. Greville Smith, Sir Robert Robinson; vice-presidents, Dr. J. H. Craik, F. P. Dunn, Sir Charles Dodds, F. Holt, Dr. Hughes, E. M. Myers and Dr. A. K. Mills; council, J. H. Bennitt, Dr. J. H. Clayton, W. J. M. Cook, G. Dring, C. S. Garland, F. A. Greene, P. J. C. Haywood, L. A. Jordan, Sir Harry Melville, Dr. F. Roffey, Prof. J. H. Turnbull, Dr. T. F. West.

Papers were presented as follows: 'Industrial aspects of fluorine chemistry', by Dr. A. K. Barbour (Imperial Smelting Corporation, Avonmouth); 'A chemical approach to crop nutrition', by Dr. C. Bould (Long Ashton Research Station); 'Trialkyl phosphates, an example of process development', by C. H. G. Hands (Albright and Wilson (Mfg.) Ltd.); 'Metallurgical problems of the turbine engine', by E. R. Gadd; 'Urethane foams, methods of production, properties and applications', by J. M. Buist, R. Hurd and Dr. A. Lowe; and 'Modern aspects of polymers', by Dr. J. J. P. Staudinger (Distillers Company Ltd.).

Presenting the council's annual report, Dr. H. K. Cameron, hon. secretary for home affairs, said that since membership

Sir Alexander Fleck, new S.C.I. president

Dr. John Ferguson, newly elected treasurer

reached its peak in 1952, there had been a steady decline each year to the present figure of 6,890, a drop over the period of 11%. The decline for 1959-60 was 1%.

Dr. E. B. Hughes, hon. treasurer, presented the accounts and balance sheet, which were unanimously adopted. This year, the publication account had been very nearly balanced. Their thanks had been expressed to the Chemical Council for financial assistance towards publications. In the past five years the S.C.I. had received £46,000 from the Council. When a grant was first sought a figure of £14,000 a year was named; in 1959-60 this totalled £4,500.

A vote of thanks to the officers was proposed by Mr. George Brearley, director, Association of Briitsh Chemical Manufacturers, paid particular tribute to the work of their hon. treasurer, Mr. Hughes, who was retiring this year.

Oxygen for Italian Steelmaking

An order, worth over £1 million, to build a 380 tons/day oxygen plant at the O. Sinigaglia steel works of Cornigliano, Genoa, Italy, has been received by Air Products (Great Britain) Ltd. The plant will consist of two generating units each capable of producing 190 tons/day of oxygen; storage for 560 tons of liquid oxygen and 420,000 cu. ft. of high pressure gaseous oxygen will be included.

Most of the plant's oxygen production will be in gaseous form but a substantial amount of liquid will also be produced and stored as an independent supply. Nitrogen of 99.8% purity will also be produced for annealing applications. The oxygen plants are of 'split cycle' design.

Digestion of Waste Sludge by Sulphate Reducing Bacteria

THE primary aim in the treatment of many wastes is the conversion of organic matter to inorganic compounds which exert no oxygen demand or into organic compounds which are temporarily stable because they are part of a living system. For wastes containing relatively high concentrations of oxidisable matter it has proved economical to use anaerobic treatment. The oxidising agents usually employed have been carbonates but a review of the literature indiciates that it should be possible to digest waste organic sludges by employing sulphate reducing bacteria.

Sludge digestion by sulphate reducing bacteria was the subject of a paper given by W. O. Pipes of Northwestern Technological Institute, Evanston, Illinois, at a conference on industrial wastes held at Purdue University, Indiana recently.

In reviewing the literature Mr. Pipes showed that there was enough evidence to indicate that a sulphate digestion process may be considered in some detail. Possible advantages of this process are (1) improved digestion of grease (2) improved digestion of hair, feathers, skin and other keratins (3) conversion of relatively cheap sulphates to the more expensive hydrogen sulphide, free sulphur or sulphur dioxide (4) possible digestion of sludges defficient in nitrogen, and (5) possible conversion of waste organic material to hydrocarbons. The disadvantages of the process are mainly connected with the toxicity and corrosive properties of hydrogen sulphide and sulphur dioxide.

The essentials of the process, together with a few of the possible variations, are shown in the flow diagram. The central circle represents a cyclic process in which sulphur acts as an oxygen carrier and theoretically it should be possible to operate this cycle as a closed system re-using the same sulphur, but in practice there would be losses of sulphur from the system and sulphate would need to be added from time to time.

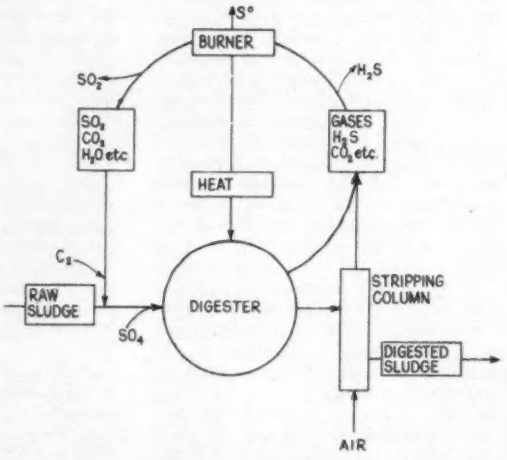
Because of the nature of hydrogen sulphide gas, several problems need to be overcome in the sulphate digestion process which are not associated with the methane process. It would be necessary to pass the digested sludge through a stripping column to remove dissolved H_2S gas, and, if the hydrogen sulphide produced in the digestion process were not utilised as a by-product, it would need to be oxidised in a burner, either partially to free sulphur or to sulphur dioxide.

In order to re-use the sulphur as an oxygen carrier for further sludge oxidation, sulphur dioxide produced by the burning of hydrogen sulphide would have to be oxidised to sulphate. Probably the best way of achieving this would be to absorb the sulphur dioxide in the incoming raw sludge and then aerate the sludge.

Before the sulphate digestion process can be considered for a specific application as a waste treatment process, more data is needed. To this end a series of preliminary experiments were carried out to determine the conditions under which an active flora of sulphate reducing bacteria could develop in a sludge digestion unit.

An artificial sludge with an initial pH of 7.8 and a chemical oxygen demand of approximately 50 g./l. was used for these series. Three digesters, each containing a litre of the sludge, 5g. of sodium sulphate per litre and 5 ml. of stale sewage, were incubated at 20°, 30° and 40°C. No difficulty was encountered in establishing sulphate digestion in a day or two. The results of these series are shown in the table.

Sulphate digestion process with possible variations



Digester temp. (°C)	*Mat. rate H_2S Production (ml./l/day)*	*Time to Max. Rate (days)*
20	6.1	3
30	12.8	1.5
40	15.7	2

After the maximum rate of sulphide production had been attained the pH of the digestion sludge decreased slowly and the rate of gas production also decreased, but, even at a pH of 6.0, the rate of sulphide production was about 20% of the maximum rate. No trace of hair or paper fibres could be found in the digested sludge.

The next step was a series of continuous digestion experiments to study the operation of the sulphate digestion process at different digester loadings. The material used in the digester was waste activated sludge which had been grown on domestic sewage. The sludge was fed to the digester at a pH of between 7.5 and 8.0. The concentrated sulphuric acid used in the preservation of the sludge and the 50% sodium hydroxide added to bring it up to the required pH before use, provided approximately 7.5 g. of sodium sulphate, per litre of sludge.

An amount of sludge calculated to give the desired loading of volatile solids per cubic foot per day was fed to the digester each day and the same amount removed.

The volume of gas evolved was measured each day and analysed to determine the percentages of hydrogen sulphide and carbon dioxide. The resulting reduction in volatile solids and chemical oxygen demand was similar to that obtained by the conventional anaerobic treatment processes at similar loadings. The quality of digested sludge seemed satisfactory from the point of view of drainability and odour.

The continuous digestion experiments do indicate that the sulphate digestion process is a feasable method of stabilising an organic sludge. The possibility that the by-products of the process, hydrogen sulphide, free sulphur and sulphur dioxide, would be of commercial value would depend upon the specific situation for which an application was being considered.

There are two possibilities which would, if realised, make the process more attractive than would at first appear. It has been reported that the sulphate reducing bacteria are able to fix free nitrogen. If this were so, the sulphate digestion process would be more economical than the conventional methane digestion for organic wastes low in nitrogen. The other possibility is the conversion of organic wastes into petroleum. Laboratory cultures of sulphate reducing bacteria have been fed on fatty acids and after an extended period of time petroleum-like hydrocarbons were isolated from the cultures. From this it was speculated that there was the possibility of the conversion of organic wastes to petroleum in an atmosphere of very low oxidation-reduction potential such as in the presence of excess hydrogen sulphide.

B.C.U.R.A. Bibliography

In connection with the 21st anniversary of the British Coal Utilisation Research Association, a bibliography of all its publications during 1938-59 has been printed. Copies are available from the Liaison and Publications Officer, B.C.U.R.A., Randalls Road, Leatherhead, Surrey, price 5s post free.

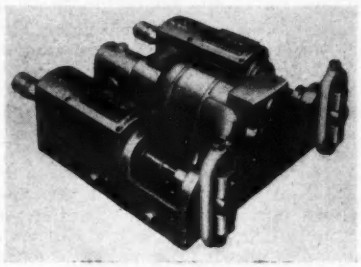
EQUIPMENT NEWS

Chemical Plant : Laboratory Apparatus : Handling and Control Equipment

DUPLEX METERING PUMPS

A DUPLEX version of their 'M' metering pump is offered by the **Distillers Co. Ltd.**, Great Burgh, Epsom, Surrey. It embodies two of the 'M' pump's standard pumping heads driven 180° out of phase from a common motor, so that the output of the pump is doubled and the flow characteristics improved when the heads are operated in parallel. As an alternative application each head can be operated as an independent metering head pumping two different liquids.

The duplex pump is designed to accommodate automatic control on both or one of the pump heads. It is available with



New duplex version of the D.C.L. metering pump

totally enclosed or flameproof motors and, as with the single head model, the pumps will also accommodate 60-cycle motors by modified gearing.

Maximum capacity of each cylinder is 8.23 gall./hr. at 50 p.s.i.g. with a series of alternative pump heads giving infinitely variable ranges of capacity for smaller volumes and higher pressures.

The price of the standard duplex pump with totally enclosed motor with separate volume control on each pumping head is about £170 and, at the present time, delivery is ex stock.

LOWER-COST DESICCATOR CABINETS

DESICCATOR cabinets or constant humidity cupboards produced by **Townson and Mercer Ltd.**, Croydon, Surrey, have now been redesigned using new materials. This has meant the introduction of new features but the advantages of the original cabinets are retained, while at the same time a considerable price reduction has been made possible.

The body itself is now of Fibreglass while all interior metal fittings are coated with plastics paint to prevent corrosion. An unframed plate glass door is still used, but the hinges have been redesigned, and a cam action closure gives greater ease of operation with the same positive seal against a tubular rubber gasket. There are four removable plate glass shelves, spaced 3½ in. apart.

Only one size is now made (overall dimensions 21 × 16 × 11 in.) and this can be fitted with a circulating fan if required. This fan, situated at the bottom rear of the cabinet, draws air from above the tray of dessicant or humidifying agent and passes it by means of a small duct to the top of the cabinet; thus ensuring that uniform conditions are maintained throughout the interior. The fact that the air is constantly moving also very greatly increases the speed of stabilisation when samples are inserted which will either lose or take up moisture.

Price of the X233 N/W dessicator cabinet without fan is £38 5s while the X233 F/W model with circulator fan costs £44 10s.

X-RAY ANALYSIS TUBES

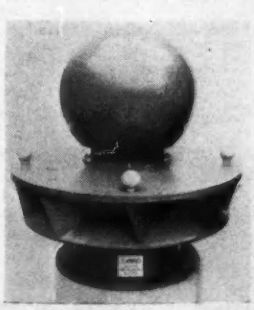
X-RAY tubes for x-ray fluorescence analysis in which the characteristic radiation from impurities in the tube anode is reduced to a very low intensity are now being produced by Machlett Laboratories Inc. They are available from **Watson and Sons (Electro-Medical)** Ltd., Industrial Division, North Wembley, Middx.

The spurious characteristic radiation generated in X-ray tubes is one of the factors limiting the sensitivity of the x-ray fluorescence method. It is claimed that the new tubes allow an improvement in sensitivity to be obtained, especially for copper and nickel, and that the effect of target impurities is now insignificant.

The improved X-ray tubes, designated AEG-50-S, OEG-50-S and OEG-60-S, have been developed from the AEG-50, OEG-50 and OEG-60 types, with which they are interchangeable. The AEG-50-S and OEG-50-S tubes have 5 mm. by 5 mm. foci and are available with tungsten or platinum anodes. The OEG-60-S tube has a 6 mm. by 6 mm. focus and is available with tungsten, platinum and molybdenum anodes. All the new tubes have beryllium windows and operate up to 50 kV.

ATTRACTIVE P.V.C. FUME FANS

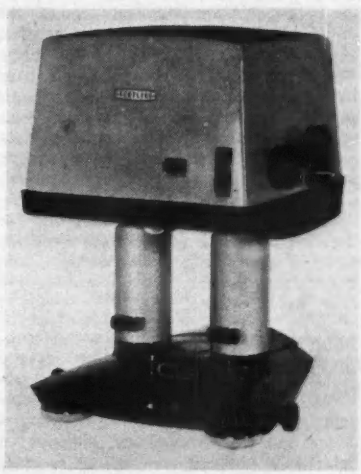
AESTHETIC design comes to the fume extraction field with the introduction of a new range of p.v.c. radial fans, as illustrated, by **Turner and Brown Ltd.**, Davenport Works, Bolton, Lancs, and **Matthews and Yates Ltd.**, Swinton, near Manchester. Aim is to eliminate unsightly ducting, discharge connections and weather cowls for laboratories, etc., where low silhouette and futuristic lines are desirable. Fans are available in six sizes: 10, 12½, 15, 17½, 20 and 25 in. Only the motor and stainless steel holding-down bolts are in metal. The sphere on top of the fan contains the motor, a feature of the design being special ventilation to ensure non-overheating of the motor during warm weather. Fans are normally in rigid unplasticised p.v.c. of grey colour, pastel shades being available at extra cost.



Radial fan in p.v.c.

OERTLING QUARTZ FIBRE BALANCE

BELIEVED to be the only commercially available quartz fibre sub-microchemical balance, the model Q.01 produced by **L. Oertling Ltd.**, Cray Village Works, St. Mary Cray, Orpington, Kent, has a readily replaceable beam which requires



Model Q.01 sub-microchemical balance

little skill in fitting, an optically projected and easily read scale, two separate thermally insulated pan compartments with good access and two pan stops. Convenience of operation arises from the use of a torsion head with coarse and fine controls and the need to tare only to the nearest 1.0 mg.

Access to the pan compartments is by means of outer covers which slide upwards. The sample is placed on the right hand pan, and the tare on the left hand pan. The pan compartments are closed, the pan arrests are lowered by means of the knob on either side of the base, and the balance is brought to equilibrium by rotation of the coarse and fine adjustments at the top right hand side of the balance. Balance is indicated when the image of a pointer on the ground glass

screen is in alignment with a reference line on the screen. The reading is then taken from the counting wheels and reading drum, and can be converted into weight by means of a calibration factor.

Capacity of the balance is 250 mg. in each pan. One division on the torsion head is equivalent to between 0.09 and 0.11 microgrammes, individual calibration being required for each beam. Stops are provided on the torsion head to limit the rotation of the torsion fibre. The rotation allowed is equivalent to 10,800 divisions, i.e. approximately 1 mg. Pans are of aluminium, width between supports 0.5 in., weighing height 0.75 in.

CAVITY ELECTRODE PACKER

CAVITY electrodes for spectrochemical analysis can be packed automatically and quickly with a new instrument, the Elpac. According to the makers, three electrodes can be packed by this method in little more than the time taken for one in hand packing; furthermore, packing is consistent, with a pronounced effect on uniformity of analytical results.

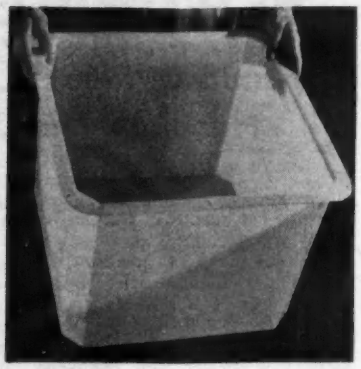
In the Elpac, which is produced by **Hilger and Watts Ltd.**, 98 St. Pancras Way, London N.W.1, a small plastic funnel fits over the end of a electrode and holds the powdered sample. A plunger rests in the bottom of the electrode cavity. The electrode, and with it the plunger, vibrates and shakes the powder into the cavity, where it is rammed quickly and evenly to the brim. The plastic funnel is cheap enough to be thrown away after use so that one sample shall not contaminate another. The base of the instrument, on which the three packing units stand, contains the electric motor that drives the vibrators and has a rheostat control to set the starting speed and running speed suitably for different materials and different electrode sizes. It also has a timing control, and the machine can be preset to run for any time up to 90 sec.

PUMP FOR DIFFICULT MATERIALS

THE Scott-Wemco Torque-Flow pump embodies what is claimed to be a new principle of construction which enables it to handle, without any clogging, a diversity of difficult materials. A recessed impeller, located completely out of the flow pattern, imparts a swirling action to the material in transit, causing suction and discharge to become one continuous open passage from inlet to exit flanges. Particles and solids are drawn into the swirling vortex and discharged with a centrifugal sweep from the open chamber, "seldom even touching the impeller".

Suppliers of the pump are **George Scott and Son (London) Ltd.**, Levenbank, Leven, Fife. The pump is capable of dealing with sludges and slurries of high solids content, tough abrasives, soft, sticky or fibrous materials can all be handled swiftly and efficiently. It can also deal with comparatively fragile substances because there are no violent directional changes or confined passages in the flow area.

POLYTHENE SHEET MATERIAL



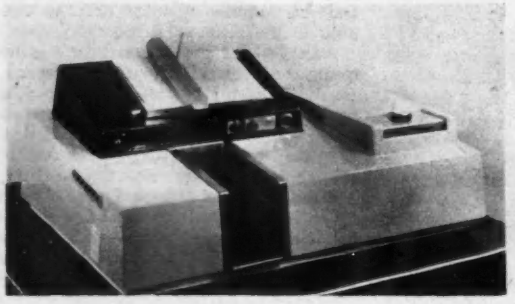
This tank was fabricated from Rigidex high-density polythene sheet, supplied by British Resin Products Ltd., Devonshire House, Piccadilly, London W1, which can also be used for other types of tanks, boxes and similar items. The material combines toughness and rigidity with resistance to chemicals, oils, greases, solvents and boiling water. The tank shown was produced by Spembly Ltd., Manor Road, Chatham, Kent

UNICAM'S NEW SP.200

ONE of the special features of the new Unicam SP.200 infrared spectrophotometer, now on display at the Moscow exhibition of the British Scientific Instrument Manufacturers' Association, is the low cost, which is under £1,400. This should open up the field of i.r. analysis to sections of science and industry previously not able to justify this powerful technique, say the makers, Unicam Instruments Ltd., Arbury Road, Cambridge.

In the hands of the organic chemist this instrument can play an important part in any programme involving chemical analysis. For routine work, the simplicity of operation and special design features make possible the delegation of time-consuming work to general laboratory staff, freeing others for more important duties. Only one operating control is used when the instrument is set up.

Claimed to be a most accurate i.r. instrument, the design incorporates long-term reliability. In our issue of 18 June, p. 1027, the Unicam spectrophotometer illustrated and referred to in the first paragraph was the SP.200; the second paragraph inadvertently described features of the well-established SP.100.

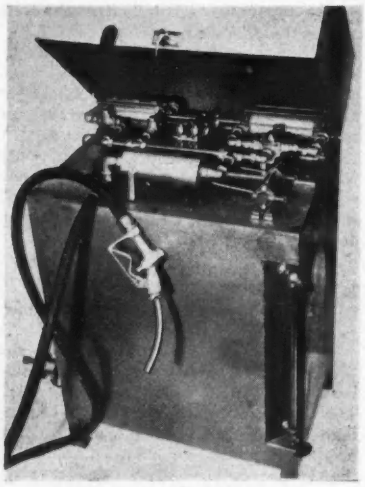


Unicam SP.200 infrared spectrophotometer

LIQUID BLENDING MACHINE

DESIGNED to bring together two or more liquids and deliver in a pre-arranged proportion through a diffuser chamber just before delivery, a new blending machine produced by **Suba Hydraulics Ltd.**, 86 Lind Road, Sutton, Surrey, is claimed to eliminate the problems usually associated with pre-mixed blends, such as settling out while in the storage vessel and intermediate tanks and pumps.

The original model was produced for the Ford Motor Co. Ltd. for the rapid filling of radiators with a mixture of water and anti-freeze, but a subsequent model is offered for a variety of industrial processes. For this unit, mains water pressure has been used as the motive power to energise the water cylinder which in turn drives the other liquid cylinders. For other blends different liquids under pressure could be used or, if desirable, air pressure. The unit is interlocked through each liquid to cause a standstill should the operator allow any of the liquids to run dry.



Suba liquid blending machine

According to the makers, it is only a matter of cylinder composition and adjustment to achieve an unlimited range of varying proportions to make any desired blend. The liquids fed into the reservoir compartments can be either pump fed, gravity fed or from local barrel.

Provision can be made for handling inflammable liquids, while, if necessary, the complete unit can be made in stainless steel wherever contact is being made with the liquid being handled.

Chemist's Bookshelf

GAS CHROMATOGRAPHY

PRINCIPLES AND PRACTICE OF GAS CHROMATOGRAPHY. Edited by *R. L. Pecsok*. John Wiley and Sons, New York, 1959. Pp. xii+226. 54s.

Gas chromatography is perhaps the most exciting analytical development of the last decade. The manifold virtues of this elegant technique for the analysis of gases and volatile materials include high resolving power, small sample requirements, rapidity and comparatively low cost ; its relevance extends to nearly all branches of chemistry and applications range from the academic study of gas kinetics to the control of flavour in beer.

This book is intended to provide an introduction to the subject. It is the outcome of a course of lectures given at the University of California, Los Angeles, in February 1959. The contributors are H. W. Patton, H. S. Knight, S. A. Greene, C. M. Drew and the editor.

An introductory chapter in which the various type of chromatography are defined, is followed by two chapters, "Fundamental Principles" and "Mechanism of Separation", which deal mainly with the theoretical principles underlying gas chromatography. Detailed mathematical arguments are avoided as the book is essentially a practical guide. In the following two chapters, the mobile phase and the stationary phase are discussed in greater detail. Other parameters are considered under the headings "Column Conditions" and "Peak distortions". The next five chapters deal with practical details: column selection, column construction, sample introduction, temperature control and detectors. The last two of these, both by C. M. Drew, deserve special praise. The final chapter, "Analytical Methods", deals in a general way with theoretical aspects of qualitative and quantitative analysis; no attempt is made to review specific applications.

The book contains two appendices. Appendix I is a list of manufacturers; British firms are not included although the Pye chromatograph is mentioned in the earlier text. Appendix II is a list of publications on both gas-solid and gas-liquid chromatography. This bibliography extends to the end of 1958 and contains some early 1959 references. The titles are arranged according to the year of publication; no author index is provided.

This book contains much useful material and provides valuable surveys of practical aspects of gas chromatography. However, it is apparent that it is difficult to synthesise an integrated, introductory text from a number of lectures by different people. Moreover, it is doubtful whether an exhaustive bibliography is appropriate in a book at this level; a brief survey of applications might have been more profitable for the average reader.

To speed publication, the book has been printed from a typescript by the photo-offset method. The result looks superficially attractive, but the reviewer found that longer reading produced eye-strain. It seems that this method of production should be discouraged unless a more legible font can be used.

PETER SCHWARZ

Industrial Toxic Agents Surveyed

TOXIC ALIPHATIC FLUORINE COMPOUNDS. By *F. L. M. Pattison*. Elsevier Monographs: Industrial Toxic Agents. Elsevier, Amsterdam, 1959. Pp. xi+227. 18s.

In his preface the author promises a balanced survey rather than an exhaustive account of the toxic fluorine aliphatics. In the event he has assembled ample information for the guidance of chemists, biochemists, toxicologists and pharmacologists. Most of the book treats of the compounds with the stable C-F bond, judicious comparison being made with the related non-toxic ones. Due allowance for the volatility or instability of fluorine compounds is made in the discussion of their toxic hazards, and the author has drawn up provisional rules for forecasting the potential danger of a new compound to the researcher who first encounters it.

Professor Pattison repeatedly stresses the unreliability of translating toxicity towards experimental animals into terms of human hazard. The medical aspects of the fluoroacetates are amply illustrated by actual case-reports of poisoning, and the forensic aspect of the compounds receives due weight. The ω-fluorocarboxylic acids, their derivatives, and other ω-fluoro compounds, including those containing nitrogen or sulphur, occupy most of the remaining text. Potential industrial uses and research applications are discussed; already fluorocompounds have achieved substantial results in the elucidation of metabolic pathways. Appropriately enough, the section on chemical warfare amounts to just two paragraphs; for the fluorine chemists, having started by forging biochemical swords, have with incredible rapidity converted these into plough shares and reaping hooks.

There are appendices summarising typical chemical reactions, detailing representative preparative procedures and epitomising the first-aid and hospital treatment of casualities. The book is lavishly provided with tables, structural diagrams and references. It is attractively but modestly turned out and Professor Pattison, by the briskness and lucidity of his style, has made it eminently readable.

PETER COOPER

New Methods in Determining Traces in Metals

COLORIMETRIC DETERMINATION OF TRACES OF METALS (3rd Edn.). By *E. B. Sandell*. Interscience, New York, London. Pp. xxii+1032. 185s.

This third edition of Professor Sandell's well known textbook on the colorimetric determination of traces of metals is approximately 50% bigger than the previous edition. It sets out to cover developments which have taken place during the years 1950-57 and its 981 pages of textual material provide a comprehensive survey of reliable methods for the colorimetric determination of small amounts of metal ions.

The text is divided into two parts. The first is concerned with general aspects of inorganic trace analysis. It discusses methods, limits and precautions and goes on to deal with the isolation or separation methods which frequently have to be applied, before the determination proper can begin. Under this heading the author discusses precipitation, chromatography, electro-deposition, solvent extraction, gas-evolution, distillation and volatilisation. The text then proceeds to make a general survey of colorimetry, spectrophotometry, fluorimetry, turbidimetry and nephelometry. Section I concludes with a survey of general colorimetric reagents, this includes seven inorganic types and 18 general organic reagents with most attention (some 38 pages) focused on that excellent multi-purpose reagent *di*-phenylthiocarbazone. This section of the book occupies the first 213 pages.

Rare Earths

Section II is concerned with the colorimetric determination of the rare-earths and 46 other elements. These are arranged alphabetically and run from aluminium through metals such as beryllium, germanium, iridium (and the other platinum metals) lithium, rhenium and sodium to zirconium. Each chapter is complete as a monograph and follows the pattern of: separations, methods of determination and, where practical, applications. Thus the chapter on molybdenum considers separations by precipitation (sulphide, α-benzoinoxime, co-precipitation with manganese dioxide), extraction (hydrochloride, cupferron, α-benzoinoxime, toluene-3, 4-dithiol) and ion-exchange. Recommended methods of determination are the thiocyanate-stannous chloride procedure and the dithiol method.

Some of the older methods have been replaced by superior new methods while others have been modified in the light of experience. Once more the author has been selective in his choice. Consequently the book is not encyclopaedic, but possesses the full flavour of that type of monograph which is too rare in modern chemsitry—the critical review. This is a book which is packed full of good sound 'straight' chemistry. It is a text which no modern inorganic laboratory can ignore.

T. S. WEST

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Chemical Reactions

The author follows this discussion with a chapter on chemical reactions, including the concepts of activity, catalysis and chain reactions. Having provided an excellent review of the fundamental background, the more important engineering applications are then discussed in chapters on chemical fuels; metals, their extraction and refining; corrosion; plastics; and lubrication. There is some unevenness in the treatment which is bound to arise from the tremendous amount of compression that is unavoidable in a book of this nature. Nevertheless, a quite high standard is maintained and the book is eminently readable.

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T.K.R.

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H. MACKLE

New Processes, Applications, for Coal Tar Products

THE following concludes our summary of important developments in the technology of coal tar and coal tar products, based on the latest 'Review of Coal Tar Technology' (July-December 1959) published by the Coal Tar Research Association. The first part of our summary appeared in CHEMICAL AGE, 2 July, p. 23.

Tar Bases. In the method of preparing substituted pyridines, devised by Praill and Whitear (Proc. Chem. Soc., October 1959, p. 312), a solution of an olefin in excess acid anhydride at 0°C is treated with perchloric acid. A crystalline pyrylium perchlorate is obtained which on subsequent refluxing with ammonium acetate in acetic acid gives the corresponding pyridine in yields of up to 50%. A patent has been granted to Rohm and Haas Co. (U.S.P. 2,847,414) for the dehydrogenation of 4-aryltetrahydropyridines to 4-arylpyridines in the liquid phase at 125-220°C in presence of a palladium/alumina catalyst and, preferably, nitrobenzene. The compounds thus prepared have a high stability, especially with regard to hydrogenation; they may be transformed into pyridine-substituted styrenes, quaternised with alkylating agents, or used in polymers and copolymers.

Separation of Aromatics

Monocyclic Aromatic Hydrocarbons. In a process of Esso Research and Engineering Co. (U.S.P. 2,885,454) an aromatised feedstock is first distilled to give an overhead fraction boiling below 145°F and two side stream fractions boiling at 145-170°F and 170-180°F. The two side streams are extracted with liquid sulphur dioxide, the second dissolves and is extracted countercurrently with a wash oil. The sulphur dioxide extracts are combined, the sulphur dioxide removed and the aromatic concentrate fractionated to give an overhead, azeotropes of the unchanged paraffins and naphthenes with benzene, and a bottom product which is at least 96% benzene and which can be further purified to yield benzene of 99% purity. Fractionation of the sulphur dioxide-extracted aromatics is also the subject of separate patent (B.P. 818,749).

Various Japanese processes for the separation of xylenes and other aromatic hydrocarbons have been reported, including one for the simultaneous manufacture of xylenes and styrene by fractionation of a crude xylene into fractions distilling at 136-137°C, 137-140°C and 144-145°C. The first, ethylbenzene, fraction is dehydrogenated at 600°C with steam over a chromia/alumina catalyst and the product fractionated *in vacuo* to yield styrene (Jap. P. 3,773, 1959). In a German process for the production of phthalic esters, oxygen is reacted with a mixture of xylene and C_1-C_4 alcohol esters of toluic acid in the ratio 1:3, in the presence of a cobalt salt of a fatty acid. The oxidation products are esterified, and toluic ester is recycled (U.S.P. 2,894,978).

Polycyclic Aromatic Hydrocarbons. Good yields of high purity naphthalene are claimed for a Rütgerswerke process by which separation from the hot oils is effected in the presence of cold water or aqueous alkali or alkali earth metal salts (German P. 824,494). According to an American patent to the Koppers Co. Inc. (U.S.P. 2,890,254) naphthalene may be purified, in the presence of phenols, by emulsification, crystallisation and separation.

Muller has contended (*Chem. Eng.*, 1959, **66**, 195, 10 August) that the process used in the new Proabd plant at the Port Clarence works of Dorman Long (Chemicals) Ltd. is covered by patents to Stamicarbon N.V., *viz.* B.P.s 664,376 and 811,559. A Proabd spokesman has pointed out, however, that B.P. 811,559 is not yet in force, and that an opposition has been entered to it on the grounds of prior publication, prior user and obviousness (J. Molinari, *Chem. Eng.*, 1959, **66**, 30 November).

A German patent (966,921) to Gelsenkirchener Bergwerks AG is for the purification of naphthalene using a continuous worm press which is heated externally so that the temperature of the screen of the press is equal to or slightly above the solidification point of the press oil. B. G. Kogan has described, in *Koks i Khim.*, 1959, No. 7, 57-8, a water-cooled coil which may be immersed in an oil drained from an inefficient crystalliser and containing a relatively high proportion of naphthalene (37% in the case cited) and so produce a second crop of crystals.

Phthalic Anhydride

The phthalic anhydride process of American Cyanamid Co., as described in *Pet. Refiner*, 1959, **38**, 285, November, utilises a fluid bed catalyst with an immediate post-reaction quench zone to obviate after-oxidation. The process operates on sulphur-free naphthalene only. The phthalic anhydride process of Scientific Design Co. Inc. has also been described; it appears to be essentially the conventional German fixed bed process (*Pet. Refiner*, 1959, **38**, 287, November).

According to Russian workers, sulphur-containing pressed naphthalene can be hydrogenated over a commercial tungsten/nickel catalyst at 50-300 atm. to give a product containing roughly 60% tetralin and 33% decalin; fractionation gives technical grades of the two solvents (N. V. Shavolina *et al.*, *Koks i Khim.*, 1959 No. 11, 45-8). The principles underlying the orientation of radical phenylation of aromatic compounds are stated to be less clear than those for electrophilic and nucleophilic aromatic substitution. This work by Huisgen *et al.* (*Chem. Ber.*, 1959, **92**, 2206-10) corrects some of the earlier determinations of the naphthalene/benzene competitive constants, which are shown to be too high owing to diphenyl losses.

The recovery of new hydrocarbons from the higher boiling fraction of coal tar is the subject of a paper by K. Lang *et al.* Pitch distillates were carefully fractionated and 16 fractions from the boiling range 262-289°C (at 1 mm. Hg) were selected for chemical processing. The application to these fractions of separation methods involving the use of molten alkali and maleic anhydride led to the isolation of 1,2:3,4-; 1,2:5,6- and 1,2:7,8-dibenzanthracene, pentaphene, *o*-phenylenepyrene, and 3,4-benztetraphene. All these compounds, with the exception of 3,4-benztetraphene, had not been isolated from coal tar before (*Brennstoff-Chemie*, 1959, **40**, 369-70, 16 December).

New Uses for Tar Products

Utilisation of Tar Products. There have been a number of references in the literature to protective coatings in which coal tar derivatives and epoxy resins are combined. Partridge, in a survey of the use of epoxy resins in coal tar coatings (*Corrosion*, 1959, **15**, 101-2, 104) gives the properties of a typical formulation containing resin 30%, tar 25%, solvent 20% and pigment 25%. The cost of such coatings is double that of coal tar alone, but installation costs are almost halved. Yugoslavian paper, discussed by P. Colomb in *Corrosion*, 1959, **15**, 133 (September), claims that the addition of very fine asbestos powder to a bituminous coating gives a thixotropic paint, a single coat of which, 100-200 microns thick, gives good protection to oil and sewer pipes.

Other uses of coal tar products discussed in the C.T.R.A. review include solid and liquid fuels, plastics and resins, and wood preservatives. It is noted that Russian investigations of the fungicidal properties of coal tar constituent have established the following order of increasing activity: bases and neutral substances, phenols, alkylated phenols, naphthols and their derivatives. It appears that the activity of neutral substances interferes with that of phenols (G. D. Kharlampovich *et al.*, *Chem. Abs.*, 1959, **53**, 13552, from *Zhur Priklad. Khim.*, 1959, **32**, 905-9).

The introduction of sulphur into higher phenols is specified as a means of producing insecticides and fungicides in a French patent (1,145,616). For instance, a coal tar middle oil (b. 195-245°C) is treated with sulphur vapour or sulphur dioxide in the presence of thoria as catalyst. The sulphurised higher phenols are used in solution in creosote or as an aqueous emulsion. From cyclopentadiene, by reaction with sodium hypochlorite, hexachlorodicyclopentadiene is formed, a useful intermediate for the manufacture of insecticides (German P. 1,006,419).

Chemistry and Chemical Technique. Subjects under this heading are discussed in Part II of the C.T.R.A. review, which deals in turn with organic, catalytic, physical and analytical chemistry and, finally, with chemical techniques such as distillation, crystallisation liquid/liquid extraction and mast transfer.

Overseas News

MOBIL FORM CHEMICAL COMPANY TO OPERATE ETHYLENE PLANT

A NEW company under the name of Mobil Chemical Co. has been formed to handle the petrochemical activities in the U.S. and abroad of Socony Mobil Oil Co. Inc., U.S. The new company, whose president is Mr. Paul V. Keyser Jnr., will operate a new ethylene plant—claimed to be the world's largest—which is to be opened in Beaumont, Tex., next year with an annual production of 380 million lb. Propylene and butadiene units are also planned for this site.

Socony Mobil's development of their Beaumont refinery has already attracted two other plants to the area. Goodyear Tire and Rubber plan to complete their 25,000 tons/year polyisoprene and polybutadiene plant there in 1961. Houston Chemical, a subsidiary of Chatham-Reading, are planning a plant at Beaumont to produce ethylene oxide, ethylene glycol, TEL and TML.

Last year chemicals and related products accounted for $90 million of the group's total gross income of $3,500 million.

Aromatics Plant for Canadian Refinery

An aromatics extraction plant to cost more than $2,500,000 will be added to British American Oil Company's Montreal East refinery. B-A has called for tenders and expects to award a contract by 1 August. Construction will begin this autumn and the new unit is scheduled to go into operation before 1 July 1961. It will be a "Udex" aromatics extraction unit developed jointly by Universal Oil Products and Dow Chemical Company.

A prime product of the extraction plant will be benzene, which is required for the cumene operation at the nearby B.A. Shawinigan petrochemical plant. There, cumene is converted to phenol and acetone which, in turn, are used by the plastics, resins and chemicals industries.

The extraction unit will be designed with provision for future production of other aromatics such as toluene and xylene which are used in the manufacture of plastics, explosives, industrial solvents and other chemical compounds.

Witten DMT Licence for Montecatini

Montecatini, Milan, have purchased a licence from Chemische Werke Witten GmbH, Witten-on-Ruhr, a 100% subsidiary of Dynamit Nobel AG, Troisdorf, for the production of dimethylterephthalate (DMT) by the Katschmann process. This process is one for the air oxidation of *p*-xylol. The Witten company is to put its experience at the disposal of Montecatini in the building of a proposed plant for DMT production by the method.

Air Liquide to Double Capacity of New Oxygen Plant

The French chemical producers, Air Liquide, are already proceeding with expansion designed to double capacity at the oxygen plant they have just erected at Richemont on the Moselle, Lorraine. At present the plant has a monthly output limit of 7 million c.m.

Chemical Plant Spending in U.S.

Figures issued by the U.S. Department of Commerce show that in the first quarter of this year some $330 million were spent on new plant and equipment for the chemical and allied industries. Seasonally adjusted, this represents an annual expenditure of $1,450 million—an expenditure rate which is expected to increase to $1,600 million in the second and third quarters of the year. It is estimated on these figures that a total of $1,590 million will be spent on such plant and equipment over the current year, as against totals of $1,230 million last year and $1,320 million in 1958.

Organotin Compound Offered for Wood Preserving in U.S.

Commercial application of an organotin chemical to a new consumer wood preservative product has been announced by Metal and Thermit Corporation, 100 Park Avenue, New York, N.Y., U.S. The new product is trade-named Oz wood preserver and is produced by Osmose Wood Preserving Co. of America Inc., Buffalo, N.Y. TBTO (tributyltin oxide) is the chemical used.

Large Algerian Phosphate Reserves to be Exploited

A project for the exploitation of widespread phosphate reserves in Algeria has been approved, it is reported from Paris. Stresspoint of the plan is the Djebel Onk area, where 800,000 tonnes of 75% phosphate are planned to be produced by open-cast production annually. This area, some 200 miles south of the Mediterranean port of Bone, is estimated to contain 500 million tonnes of crude phosphate. Value of the project is put at NF.130 million.

Pechiney Group Plan to Raise Titanium Oxide Capacity

Société des Fabriques de Produits Chimiques de Thann et Mulhouse, a Péchiney subsidiary, who with their own subsidiary, Les Produits de Titane, are one of the Continent's main producers and exporters of titanium oxide, plan a sharp increase in production capacity. At present this capacity, centred on plants at Thann and Le Havre, is 27,000 tonnes annually; it is now hoped to increase it to some 49,500 tonnes a year. Turnover in 1959 was 11% higher than in 1958.

I.C.I. Polythene Project in Argentina

Industria Quimicas Argentinas (Duperial) the I.C.I. South American subsidiary, is to build a £5.75 million polythene plant in Argentina. The new plant will use the I.C.I. high pressure polymerisation process based on ethylene. Raw material will be obtained locally from the cracking of light petroleum distillate. The plant, with a capacity of 10,000 tons per year, is to be financed by the parent company.

Polythene Liners for Water Ponds

Liners of 8 mil black polythene film are being used for artificial ponds of water installed in Canadian forests for fire-fighting purposes. The polythene liner eliminates loss of water that would normally seep through the soil. Ponds are square in plan, with sloping banks. The liners are fabricated in film made from Union Carbide polythene.

Sulphur Plant for Poland

At a combine to be opened during this year on the site of one of the largest sulphur deposits in the world, at Tarnobrzeg in Poland, some 100,000 tonnes of sulphuric acid, the same amount of sulphur and 200,000 tonnes of superphosphates will initially be produced per year. Output will be increased at the plant over a long period of years to reach 500,000 tonnes of sulphuric acid, 1,000,000 tonnes of sulphur and 800,000 tonnes of superphosphates annually.

Nitrogenous Fertilisers In France

A plant for the production of nitrogenous fertilisers is to be built by the Société Chimique de la Grande Parcisse at Donges, near the French city of Nantes. Initial production of the production unit, hoped to come on stream in 1962, will be 250,000 annual tonnes. Raw materials will be refinery gas from the nearby oil refinery of Antar S.A. and from Lacqnatural gas.

I.C.I.A.N.Z. Abandon Pigments Project

Imperial Chemical Industries of Australia and New Zealand have abandoned their plans to build a £A1.5 million pigments plant on a site at Altona, Victoria.

Achema Congress and Exhibition

The European congress of chemical engineering 1961, which will take place from 9 to 17 June in Frankfurt in conjunction with the Achema congress, will include the following congresses and

meetings: the Achema exhibition and congress of chemical engineering organised by Dechema; the special meeting and lectures of the Gesellschaft Deutscher Chemiker, the annual meeting of the Dechema Deutsche Gesellschaft für Chemisches Apparatewesen, the annual meeting of the Isotopen-Studiengesellschaft as well as a symposium on 'The physical and chemical durability of structural materials in the chemical industry', being the 15th meeting of the European Federation of Corrosion.

Copies of the invitation brochure in English can be obtained free from Dechema, Frankfurt am Main 7, Postfach.

Australian Firm May Not Use Bayer Trade Mark

Under a ruling of the Australian High Court, the pharmaceutical company Pharma Pty. Ltd., Sydney, a subsidiary of Sterling Drug Inc., New York, may use neither the word 'Bayer' nor the cross trade-mark of Farbenfabriken Bayer AG, Leverkusen, West Germany.

New Antibiotics Plant Near Rome

Isveimer have financed the construction of an antibiotics plant at Pomezia, near Rome. The new plant will cost about Lire 100 million.

Dow Polythene Plant for Greece

Dow Chemical are to invest $3.5 million in the construction of a polystyrene plant in Greece.

U.S. Plans to Produce Leather from Collagen Solution

A pilot plant to produce a new type of leather is to be set up by Armour Leather, Chicago, and United Shoe Machinery, Boston, at a site to be decided. Size of the plant has also to be decided, but it will be based on a process to convert collagen—85% of hide protein solids—to a solution. This solution will then be used to extrude a continuous sheet of reconstituted leather to any shape or thickness. It is stated that the leather will be as good as much as that now made, but with less processing waste from skin irregularities and blemishes.

More Caprolactam Output in West Germany

Badische Anilin- und Soda-Fabrik of Ludwigshafen has decided to increase its caprolactam output during the next two years to about 50,000 tons per year from the present level of about 30,000 to 35,000 tons. Part of the output will be utilised by Badische for making Ultramid, a polyamide, but the bulk will be sold to Perlon fibre manufacturers.

Saran Yarn Production in Australia

Saran yarn, used in the manufacture of TV and radio grille fabrics and for furnishing and upholstery materials, is now being made in Australia for the first time. Under licence from an associate of the Dow Chemical Corp. of America, a Sydney firm, Synthetic Yarns Pty. Ltd. has commenced its manufacture recently and it is expected that an expansion in plastic weaving will follow at an early date.

International Laboratory Exhibition to be Repeated-Basle

The international exhibition and congress for laboratory technique, measurement technique and automation in the chemical industry held under the title I.L.M.A.C. in Basle last November is to be repeated, due to the great success of the 1959 event. The second I.L.M.A.C. will also be held in the Swiss city, on the site of the Swiss Samples Fair, from 15 to 20 October, 1962.

New Heat-resistant Fibres from West German Firm

The West German synthetic fibre producers Vereinigte Glanzstoff-Fabrieken AG have developed stabilised fibres from the synthetic materials Perlon, nylon and Diolen, which permit the production, at temperatures of as high as 180°C, of rubberised or plastics-coated fabrics.

Increased Sales, New Projects for Hooker Chemical in U.S.

In its six months' report to shareholders on 5 July, Hooker Chemical Corporation, New York City, states that for this period ending 31 May, sales totalled $74,994,900, compared with $74,732,200 for the same period in 1959. Net income was $6,387,800 compared with $6,897,700 for the equivalent 1959 period. The lower earnings, despite a modest increase in sales for the six months are attributed to several factors including increased emphasis on expenditures for research and development and higher costs for labour and many purchased materials.

Recently announced plans for increased production facilities include a new phenol plant to be located near South Shore, Ky., which will materially increase the output of the Durez plastics division; a sodium hexametaphosphate plant at Jeffersonville, Ind., for the phosphorus division, representing further diversification in manufacturing; and new semi-commercial plant facilities at Niagara Falls to produce more economically and more rapidly those new products being market-tested in semi-commercial programmes.

Koppers Establish Japanese Subsidiary

Heinrich Koppers GmbH, Essen, gas and chemical plant contractors, have set up Nippon Koppers Yugen Kaisha in Tokyo to handle Koppers interests in the Far Eastern installation field.

New Australian Solvent-scouring Process for Wool

G. H. Mitchell and Sons Ltd., Adelaide, Australia's largest wool top makers, have introduced a new solvent-scouring process for wool. Developed by the Commonwealth Scientific and Industrial Research Organisation, it will replace the former soap-soda method. The new process scours wool four times faster and makes use of white spirit. The solvent-treated fibres are claimed to be stronger. Each day some six tons of dirt are removed in the process; rich in potash, this dirt is purchased by local fertiliser producers.

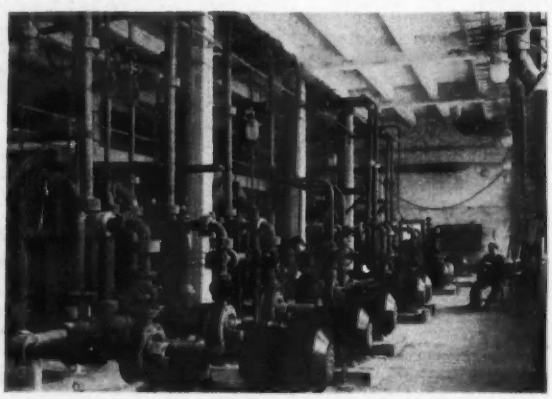
New Plant for Fertilisers and Synthetic Fibres in China

First stage of a big synthetic ammonia fertiliser project in the Lanchow (north-west China) chemical works has been completed. The fertiliser department of the works has been designed in the Soviet Union and the main equipment is Russian. The works will also produce synthetic rubber, the synthetic rubber section being still under construction.

China's first polyacrylonitrile fibre plant recently went into production at the Shanghai synthetic fibre pilot factory. The equipment for the plant, which is fully automated, was designed and made in China. Also at Shanghai, at the Tienyuan chemical works, is a plant for producing caustic soda by electrolysis, which is claimed to have last year more than doubled the 1958 of caustic soda and hydrochloric acid, due to technical innovations.

Last year a laboratory attached to a Shanghai chemical plant succeeded in extracting p.v.c. from alcohol made from potatoes. It is now being produced on an experimental basis.

At another of China's major chemical centres—Kirin, in the north-east—a sulphuric acid plant in the dyestuff factory is reported to have exceeded its designed capacity by 20% in 1959.



View inside the sulphuric acid plant at the Kirin dyestuffs factory in China

PEOPLE in the news

● **Mr. P. S. Rendall,** a deputy chairman and a managing director of Courtaulds Ltd., has been appointed chairman of the preparatory committee of the second world congress of man-made fibres which is to be held in London during 8-11 May, 1962, under the auspices of the International Rayon and Synthetic Fibres Committee. Mr. Rendall is a vice-president of the I.R.S.F.C., and chairman of the British Man-Made Fibres Producers' Committee. He is also chairman of both British Celanese Ltd. and British Nylon Spinners Ltd., and a director of Snia Viscosa. **Dr. H. A. Thomas, Ph.D., B.Sc., F.R.I.C., F.T.I., F.S.D.C.,** a director of Courtaulds Marketing Division, is chairman of the working committee of the congress. **Mr. A. W. Marsden, M.Sc., D.I.C., A.R.C.S., F.R.I.C.,** is organising secretary in charge of implementing arrangements for the congress. **Miss B. G. Hulsen** has been appointed assistant secretary and **Mr. W. R. Beath, M.Sc.,** Courtaulds Marketing Division, has been seconded to the secretariat as part-time textile liaison officer. Congress offices are temporarily at 86 Brook Street, London W.1 (Mayfair 4452).

● **Sir Alexander Fleck, K.B.E., D.Sc., LL.D., F.R.S., M.I.Chem.E., F.R.I.C.,** formerly chairman of I.C.I., has been appointed chairman of the Nuclear Safety Advisory Committee set up by the Minister of Power to advise on the safety aspects of nuclear installations. Sir Alexander, it will be recalled, was chairman of the three committees set up to investigate matters arising from the accident at the Windscale factory of the U.K.A.E.A. Other members of the Nuclear Safety Advisory Committee include **Mr. R. E. Newell,** managing director, I.C.I. Wilton works; **Sir John Cockcroft, O.M., F.R.S.,** master of Churchill College, Cambridge; **Mr. P. T. Fletcher,** deputy managing director, A.E.A. Development and Engineering Group, Risley; **Maj.-Gen. S. W. Joslin,** chief inspector of nuclear installations; **Prof. I. M. Kay,** professor of nuclear power, Imperial College of Science and Technology; **Dr. J. Loutit,** director, Medical Research Council radiobiological research unit, Harwell; **Mr. T. W. McCullough,** chief inspector of factories; **Dr. A. S. McLean,** director, Health and Safety Branch, A.E.A.; **Mr. G. W. Raby,** managing director, Atomic Power Constructions Ltd.; **Dr. F. A. Vick,** deputy director, A.E.R.E., Harwell; and other distinguished representatives of science and industry.

● **Dr. H. W. Douglas, D.Sc., Ph.D. (Liv.),** and **Dr. T. B. Grimley, B.Sc., Ph.D. (Bris.),** have been appointed senior lecturers in inorganic and physical chemistry at Liverpool University with effect from 1 October.

● The following organisational changes in the Mond Nickel Co. Ltd. and its subsidiary company, Henry Wiggin and Co. Ltd., have been made: **Mr. G. Archer** relinquishes his positions as chairman of Mond and Wiggin and is appointed president of the two companies, while **Mr. Ivon A. Bailey** is appointed chairman and chief officer. **Dr. L. B. Pfeil** becomes vice-chairman of Mond, **Mr. J. O. Hitchcock** is appointed managing director of Mond and deputy chairman of Wiggin, and **Mr. H. W. G. Hignett** is appointed managing director of Wiggin.

● **Professor Dr. Ulrich Haberland,** head of Farbenfabriken Bayer AG, Leverkusen, has been awarded the rank of Officer in the National Order of the Southern Cross, of Brazil, by the country's president Juscelino Kubitschek, for his work in the industrialisation of Brazil.

● **Dr. T. F. West, Ph.D., D.Sc., F.R.I.C., A.M.I.Chem.E.,** European operations executive of the African Pyrethrum Technical Information Centre, who has been appointed editor of *Chemistry and Industry*, published by the Society of Chemical Industry, will take up his appointment in December. He succeeds the late **Mr. W. E. Dick,** who died earlier this year. **Mr. J. G. M. Thorne,** who has been acting editor of the journal since Mr. Dick's decease, has tendered his resignation and will be leaving at the end of September.

● **Mr. J. A. Harvey** has resigned as general sales manager (Bisol) of the Chemical Division of the Distillers Company Ltd. and **Mr. R. M. F. Fenning,** formerly marketing manager, has been appointed in his place. **Mr. A. A. Puddick,** export sales manager, has been appointed marketing manager, and **Mr. J. Tedd** succeeds Mr. Puddick as export sales manager.

● **Mr. Horace W. Hooker,** who has been appointed manager of licensing for Hooker Chemical Corporation, 910 Fifth Avenue, New York City, is responsible for coordination of the programme for licensing to others the company's own experience and patents on products and processes as well as for investigation and licensing of protected products and processes from others for use by Hooker. Mr. Hooker continues as a vice president and a director of Hooker Chemicals Limited, a Canadian manufacturing subsidiary.

● **Lieut.-Col. P. F. Benton Jones,** managing director (mining and carbonisation) of United Steel Companies Ltd., relinquished the position of general manager of United Coke and Chemicals Co. Ltd., on June 30. **Mr. A. L. Curtis,** operations manager of that company, became general manager of U.C.C. on 1 July.

● **Mr. A. Stevens** has rejoined Honeywell Controls Ltd. as senior flow engineer at the company's Greenford (Middlesex) head office. His previous career includes two years with the company as instrumentation contracts engineer. **Mr. R. W. H. Vivian** has been appointed at the Honeywell head office to specialise on application engineering using electric miniature instrumentation which is being introduced to the U.K. this year.

● **Dr. P. H. Calderbank,** formerly of the Department of Scientific and Industrial Research, has been appointed Professor of Chemical Technology, at Edinburgh University.

● The first Indian organic chemist to be elected Fellow of the Royal Society is, as announced recently, **Professor T. R. Seshadri, Ph.D. (Man.),** head of the Department of Chemistry at the Delhi University. Author of communications, his main contribution is in the chemistry of naturally occurring compounds, particularly flavonoids. Professor Seshadri gained his Ph.D. at Manchester where he worked under the guidance of Sir Robert Robinson. He has also worked in London, Edinburgh and Graz. President of the Royal Institute of Chemistry, North Indian Section, he is the local representative of the Chemical Society.

● **Mr. J. N. Laughan** has resigned his position as works manager of Permoglaze Ltd. to take up an appointment as works manager (Paints Division) of the Humber Oil Co., Hull.

● **Mr. A. Maclean,** secretary of Lever Bros. Port Sunlight Ltd., formerly technical manager of Lever Bros.' Italian factory in Milan, is secretary of the new company, Unilever Merseyside Ltd., which will handle the company's estates and industrial services on Merseyside.

● Publicity manager **Mr. Colin Baillieu** has taken up his appointment with Chemstrand Ltd., manufacturers of Acrylan. Previously he was advertising manager of British Aluminium Ltd.

● **Mr. P. S. Bale Rees, B.Sc., D.I.C., A.M.I.Chem.E.,** has been appointed senior chemical engineer of the chemical plant department of Simon Carves Ltd.

● **Mr. Ian D. Ritson,** who has been appointed to the newly created post of director of construction of Olin Mathieson Chemical Corporation, New York, was project manager for Perini Ltd., Toronto.

Commercial News

- **Record Overseas Sales for Beecham Group**
- **Cambridge Instrument–E.I.L. Merger**
- **S. African Ammonia-urea Plants' Progress**
- **Laporte Offer for Spence Unconditional**

Beecham Group

A record level of £15.45 million—an increase of £3 million—was achieved in overseas sales by the Beecham Group, states the chairman in his review. Increase in profit was not commensurate, owing to development expenditure. Current projects include the construction of a new antibiotics factory at Worthing, expected to be in production before the end of the year. So far the board has approved capital expenditure of the order of £1.5 million for antibiotic development. Broxil, first of the group's new antibiotics, was made available to the medical profession last October.

Beecham's increased profits and dividend were reported in CHEMICAL AGE, 28 May, p. 887.

Aspro-Nicholas

Arrangements for the funding of £2 million of the £2,449,234 group's bank indebtedness by an issue of Loan capital are well advanced, according to the annual review of Aspro-Nicholas' chairman. He reported that, despite difficulties in many export markets, overall results were good and it is proposed to effect a change of emphasis in the more reliable markets and introduce new products. To meet the threat of import restrictions in some markets it was foreseen that manufacturing units would have to be established in some of them.

In connection with the announced three-for-two scrip issue (CHEMICAL AGE, 18 June, p. 1032) it is proposed to increase the authorised Ordinary capital to £5.5 m. by creating 10 m. new 5s shares.

Ashe Chemicals

Group net profit of Ashe Chemicals for 1959 was £35,000 (£33,950), and the dividend as stated on the 9 June is 16% (15). Fixed assets are £228,170, investments £60,305, current assets £158,000 and liabilities £104,902. The company's annual general meeting will be held on 13 July.

Cambridge Instrument/E.I.L.

Merger of two well established instrument companies is foreshadowed in the offer by Cambridge Instrument Co. Ltd. for the whole of the ordinary share capital of Electronic Instruments Ltd. The offer is on a share exchange basis of seven Cambridge 5s shares for three £1 E.I.L. shares. The merger has been mutually sought.

It is intended that Electronic Instruments Ltd. will operate under their own name and that the present chairman, managing director and sales director will continue to serve in these capacities, and that they will be joined by three directors of Cambridge Instruments. The Electronic Instruments Group operate two factories in Richmond, Surrey, and have associated companies in France, Canada and Australia. During their 16 years' existence, E.I.L. have developed and marketed a range of measuring units in the scientific, industrial and nuclear fields. Most E.I.L. activities are complementary to those of the Cambridge Instrument Co.

Cambridge Instrument Co., first formed as the Cambridge Scientific Instrument Co. in 1881, have several factories and a number of overseas subsidiaries, including a 51% holding in the Cambridge Instrument Co. Inc., U.S.

Amber Chemical

Net profit for 1959 of Amber Chemical Industries Ltd. was £7,464 (£7,908), before tax of £2,429 (£2,900). A debit balance of £50,216 (£67,221) is carried forward. It is hoped to pay another year's preference dividend in December.

Yorkshire Dyestuffs

Mr. F. A. Helme, chairman of Yorkshire Dyeware and Chemical, has stated that trading in the current year has continued at a satisfactory level, in spite of the fact that the industry no longer had the support of the Dyestuffs Act. Competition was keener and profit margins were smaller.

African Explosives

The chairman's review accompanying the annual report of African Explosives and Chemical Industries Ltd. reveals that the £10 million ammonia-urea complex at Modderfontein is expected to be in full production before the end of the year. Elsewhere there have been increases in sales of explosives, fertilisers, industrial chemicals, calcium cyanide, paints, and calcium carbide and decreased sales of plant protection products. South African Titan Products (Pty.) Ltd. has been formed jointy with British Titan Products Co. Ltd., to start manufacture at Umbogintwini where a factory will be constructed shortly.

Manufacturing and trading profits in 1959 were £5,420,000, against £4,530.000 in 1958. The profits after taxation and deduction of minority interests were £3,230,000 (£2,330,000), out of which dividends totalling £2,915,000 (£2.015,000) have been provided. A final ordinary dividend of 8½% will bring the total to 12½%, against the 10% paid in each of the two preceding years.

Progil-Bayer-Ugine

Progil-Bayer-Ugine, a French-based company owned by a consortium of the Progil and Ugine chemical companies of France and Farbenfabriken Bayer AG, of West Germany, have raised their capital by the issue of new shares from N.F.2.5 million to N.F.15 million. This move has been made to finance the erection of production plant at Pont-de-Claix, near Grenoble, for the manufacture of isocyanates, polyesters and polyethers for the foam, adhesives and lacquer industries. The plant is planned to come on stream next year.

Peter Spence

The offer of Laporte Industries Ltd. for Peter Spence and Sons Ltd., Widnes, has become unconditional, acceptances having been received in respect of 90% of the 5% cumulative preference and more than 98% of ordinary shares.

In Parliament

M.P.'s Urge Weight Marking on Soap Powder Detergent Packets

Asked whether he would make regulations to ensure that accurate measures of the contents, and where practicable a statement of ingredients, are clearly marked on the containers of soap powders, detergents, etc., the President of the Board of Trade replied that he had no power to make such regulations, but that he was considering the inclusion of proposals about marking the amount of the contents in the new Weights and Measures Bill, which it is hoped to introduce in the next Session.

One member, Mr. F. Noel-Baker, pointed out that modern point of sale design techniques make it very easy to produce misleading packages, while another, Mrs. Braddock, claimed that very few soap powder packets are full when they reach the consumer. Two further speakers urged that the price should also be marked on such packets.

Potash Subsidy

The Minister of Agriculture, Mr. John Hare, told Mr. John Hall (Cons., Wycombe) in the Commons that none of the objections to a subsidy on potash had been removed as a result of the discussions with the principal buyers. He added that, in spite of the lack of subsidy, farmers and horticulturists were using nearly 80% more fertiliser than they did in 1952-53.

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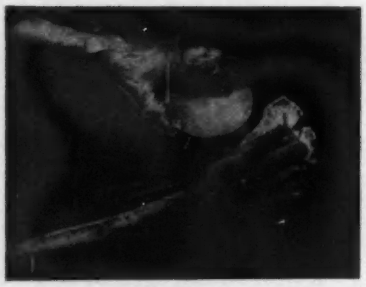

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TRADE NOTES

Nylatron GS Price Cut

From 4 July the price of Polypenco Nylatron GS (molybdenum disulphide filled Nylon 66) rod was reduced by 10% thus bringing Nylatron GS rod prices into line with Nylon 66 prices. This price reduction is made possible because of increased usage of the material, state Polypenco Ltd., 68-70 Tewin Road, Welwyn Garden City, Herts.

Lactic Acid Prices Cut

From 1 July Bowmans Chemicals Ltd. have reduced the selling prices of lactic acid. In the case of edible 80% lactic acid, the new price is 2s 2½d/lb., representing a reduction of £42 a ton and C.P. grade 80% lactic acid is 1s 11d/lb., showing a reduction of £21 a ton.

Vybak Colourmix Range

Bakelite Ltd., 12-18 Grosvenor Garden, London S.W.1, have introduced for the first time in the U.K. their range of Vybak Colourmix compound (DVN-770), which provide a convenient system for obtaining a wide range of colours for use in general purpose p.v.c. extrusion work. The range has been extended by the introduction of harder and softer versions of the materials—Vybak Colourmix compounds DVN.660 and DVN.880 which have a B.S. softness of approximately 20 and 60 respectively.

Rotary Feed Valves

Rotary feed valves for feeding and discharging powder, dust and granular materials to and from spiral conveyors, chutes, hoppers, mills, cyclones, etc., are described in leaflet No. 602 from Visco Engineering Co. Ltd., Stafford Road, Croydon, Surrey. Both standard type and vacuum type valves are described and dimension diagrams and a throughput chart are included.

Quenzine Quench Oils

Quenching oils containing Quenzine—a formulation of wetting oils and other ingredients developed in the U.S. by Aldridge Industrial Oils, Inc.—are now being made in this country and marketed by the Electric Resistance Furnace Co. Ltd., Queens Road, Weybridge, Surrey. Quenzine contains no soaps or fats and is not affected by filters.

Coating Polystyrene Granules

The Manesty drum mixer is finding application in the plastics industry for coating polystyrene granules with a powdered lubricant. A further adaptation is the incorporating of colour at the same time. In addition to the unit drum mixer, Manesty can supply drum mixers arranged for a continuous mixing process.

Wilkinson's Leicester Office

James Wilkinson and Son Limited, of Sheffield, a member of the Laporte Group, opened a Midlands area office on 1 July at 153 Parker Drive, Leicester (Leicester 63861) which is also the Midlands area office of other Laporte companies. Additional products which will now be obtainable from Leicester include hydrofluoric acid, fluorine chemicals, analytical reagent acids and commercial acids. This direct representation will enable closer and more personal contact to be made with Wilkinson's Midlands customers in many industries.

New Packaging Techniques

A new leaflet is available from British Resin Products Ltd., Devonshire House, Piccadilly, London W.1, describing "the growing use of Rigidex high density polyethylene in the important field of packaging", where the introduction of Rigidex high density polyethylene has made it possible to provide packs and packaging methods which could not be achieved as effectively or as economically in other materials.

Market Reports

Increase in Chemical Export Trade

LONDON Home trade demand for industrial chemicals has been sustained both as regards contract deliveries and new bookings, and the price level remains fairly steady. Among the soda products a good movement into consumption has been reported for chlorate, yellow prussiate and hyposulphate of soda, and there has been a steady call for supplies of acetic acid, formaldehyde and borax.

Export trade in chemicals continues to be satisfactory with the returns for the past 5 months of the year showing a substantial increase over the corresponding period last year. Phthalic anhydride and naphthalene are among the chemicals exempted from import duty until 1 October by the Import Duties (Temporary Exemption) No. 6 Order.

Lower prices for some of the lead compounds have been notified, white lead being currently quoted at £116 15s per ton, red lead £104 5s per ton and litharge £116 5s per ton. Creosote oil and cresylic acid are in steady call in an unchanged coal tar products market.

MANCHESTER Contract deliveries of heavy chemicals to users in Lancashire and the West Ridng areas continue to be affected by suspensions due to holiday stoppages at textile mills and other outlets, but apart from this factor supplies generally, including potash, soda and ammonia compounds, seem to be moving satisfactorily in the home trade. The shipping movement in the aggregate has also been well maintained. Little change of any consequence in the price position has occurred. The light and heavy tar products are mostly finding a ready outlet, and additional buying interest in the compounds and other sections of the fertiliser trade, mainly on an early delivery basis, has been reported.

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AP43

NEW PATENTS

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Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 10 August

Process for the manufacture of plastics. Farbenfabriken Bayer AG. **843 703**

Pyrazolone derivatives. Sandoz Ltd. **843 690**

Water-insoluble monoazo-dyestuffs of the benzene-azo-naphthalene series and process for their manufacture. Farbwerke Hoechst AG Vorm. Meister, Lucius & Brüning. **844 394**

Metal complexes of monoazo dyestuffs and their production. Badische Anilin- & Soda-Fabrik AG. **844 214**

Monoazo dyestuffs containing phenylsulphonamide groups and metal complexes thereof. Holliday & Co. Ltd., L. B. **844 216**

N - (5-nitro-2-furyl)-alkylidene-3-amino-5-tertiary aminomethyl-2-oxazolidones and chemotherapeutic composition containing them. Norwich Pharmacal Co. **843 834**

Production of starch and ethanol from starchy vegetable materials. Malchar, J., and Lan, J. **844 253**

Synergistic mixtures of antioxidants for natural and synthetic rubber. Goodyear Tire & Rubber Co. **843 853**

Polymerisation of acrylic compounds. Kalle & Co. AG. **843 854**

Chromium containing benzene-monoazo-pyrazolone dyestuffs and their use. Geigy AG, J. R. **844 398**

Preparation of organic phosphorus compounds. Murphy Chemical Co. Ltd. **844 402**

Process for the production of elastic plastics of high molecular weight. Farbenfabriken Bayer AG. **843 704**

Gas liquefaction apparatus. Spalding, D. B. **844 173**

Process for the production of vat dyestuff pigments in a finely divided form. Ciba Ltd. **844 405**

Process for preparing copolymers of allyl alcohol and vinyl-aromatic compounds; the resulting copolymers; and their use for preparing ester materials. Bataafsche Petroleum Maatschappij N.V., De. **844 406**

Process for the production of ammonium uranate. Deutsche Gold- Und Silber-Scheideanstalt Vorm. Roessler. **844 407**

Polyurethane plastics. Farbenfabriken Bayer AG. **843 841**

Substituted 3,5-diketo-pyrazolidine. Sandoz Ltd. **843 691**

N-acyl-3-chlorocaprolactams and their conversion to 6-acylamino-2-chloro-hexanoic acids. Merck & Co. Inc. **844 267**

Preparation of 3 β-hydroxy-6-methyl-25D-spirost-5-ewe or the β-acyl derivatives thereof. British Drug Houses Ltd. **843 664**

Blends of silicone rubber and crystalline ethylene polymer and method for production thereof. Phillips Petroleum Co. **843 665**

Polymers of fluorinated organic compounds. National Research Development Corporation. **843 795**

Process for the reactivation of active carbon which has been used for the removal of carbon disulphide from exhaust air. Spinnfaser AG. **844 474**

Polyurethane plastics. Farbenfabriken Bayer AG. **843 796**

Plasticised vinyl chloride resins. Imperial Chemical Industries Ltd. **844 310**

Process for the production of polyamides having modified terminal groups. Vereinigte Glanzstoff-Fabriken AG. **844 479**

Pyridine carbonyl hydrazones. Sandoz Ltd. **843 692**

Epoxy alcohol and ethers or esters thereof. Union Carbide Corporation. **844 312**

Olefin hydration process using halogenated aromatic compounds. Esso Research & Engineering Co. **843 671**

Means for separating water from hydrocarbon liquids. British Filters Ltd. **844 194**

Biguanide salts. Imperial Chemical Industries Ltd. **843 676**

Process for the production of copolymers of ethylene. Farbenfabriken Bayer AG. **843 974**

Rigid thermoplastic moulding compositions. Imperial Chemical Industries Ltd. **844 315; 844 325**

Process for the production of filamentary materials from polycarbonates. Farbenfabriken Bayer AG. **844 488**

Preparation of Δ 1,4-3-ketosteroids. Takeda Pharmaceutical Industries Ltd. **844 319**

Processes for the recovery of ammonia from coke oven gas. Koppers Co. Inc. **844 326**

Method for cross-linking polymers of hydrocarbon olefines. Dow Chemical Co. **844 231**

Dehydrogenation. Du Pont De Nemours & Co., E.I. **843 717**

Pyrazolone derivatives. Sandoz Ltd. **843 693**

Esters of aromatic dicarbylic acids. Imperial Chemical Industries Ltd. **844 237**

Purification of gases. Soc. Pour l'Equipement Des Industries Chimiques, S.P.E.I.C.H.I.M. Reunion Des Anciens Etablissements Barbet, Egrot & Grange, Pingris & Mollet-Fontoine, and Guinot, H. M. **844 095**

Production of monopersulphuric acid. Du Pont De Nemours & Co., E.I. **844 096**

Chromium-containing benzene-monoazo-naphthalene dyestuffs and their use. Geigy AG., J. R. **844 333**

High barium content complex salts of sulphonic acids. Socony Mobil Oil Co. Inc. **844 335**

Anthraquinanoid dyestuffs. Imperial Chemical Industries Ltd. **843 985**

Preparation of macromolecular polycarbonates. Onderzoekingsinstituut Research N.V. **843 881**

Process for the production of coupling phthalocyanine derivatives. Farbenfabriken Bayer AG. **844 419**

Preparation of ethylene sulphite. Brotherton & Co. Ltd. **844 104**

Esters derived from amino-alcohols and aromatic α-hydroxy-carboxylic acids and a method of synthesis thereof. Norgan S.A. **844 340**

Process for the manufacture of gibberellic acid. Imperial Chemical Industries Ltd. **844 341**

Quinolizine derivatives and a process for the manufacture thereof. Roche Products Ltd. **844 342**

Substituted 3,5-diketo-pyrazolidines. Sandoz Ltd. [Addition to 843 691.] **843 694**

Continuously heated carbon black furnaces. Commercial Solvents Corporation. **844 345**

Method of manufacturing moisture-proof regenerated cellulose film. Dainihon Cellophane Kabushiki Kaisha. **844 509**

Method and apparatus for carrying out exothermic vapour phase reactions. Chemical Construction Corporation. **843 882**

Process of laminating a layer containing triazine aldehyde resin to a metal. Konigsberg, M., Austin, H. F., Campins, F. C., Kane, H. L., and Weizenhoffer, E. A. **844 510**

Preparation of 3:5-diketo-pyrazolidine derivatives. Sandoz Ltd. [Addition to 843 688.] **843 993**

Plastic composition. General Tire & Rubber Co. **844 240**

Process and apparatus for the manufacture of urea. Inventa AG Für Foschung Und Patentverwertung. **844 110**

Aromatic ethers. Soc. Des Usines Chimiques Rhone-Poulenc. **843 883**

Thermal treatment of hydrocarbons. Soc. Belge De l'Azote Et Des Produits Chimiques Du Marly **843 884**

Sulphonyl derivatives. Monsanto Canada Ltd. **844 114**

Hydrogen chloride purification. Scientific Design Co. Inc. **843 996**

Chlorine recovery. Scientific Design Co. Inc. **844 115**

Process for preparing 3:5-diketo-pyrazolidine derivatives. Sandoz Ltd. [Addition to 843 688.] **844 001**

Recovery of contaminated guanidine thiocyanate. American Cyanamid Co. **844 117**

Organosilicon compositions for rendering masonry water-repellant. General Electric Co. **844 273**

Protection of steel from hydrogen damage. Institut Francais Du Petrole, Des Carburants Et Lubrifiants. **844 227**

Substantive triazine monoazo dyestuffs. Sandoz Ltd. **844 353**

High impact polymerised vinyl aromatic compounds Styrene Products Ltd. **843 729**

Organosilicon compounds. Midland Silicones Ltd. **844 421**

Siloxane elastomers. Midland Silicones Ltd. **844 128**

Process for the manufacture of lead-alkyl and lead-aryl compounds. C.I.P. Compagnia Italiana Petrolio S.p.A. **844 422**

Chlorosiloxanes. Midland Silicones Ltd. **844 279**

Stationary liquid phase for gas chromatography. Standard Oil Co. **844 424**

Electrolytic baths and additives for use therein. Metal & Thermit Corporation. **843 741**

Purification of ethers. Argus Chemical Corporation. **843 742**

Elastometers. Bataafsche Petroleum Maatschappij N.V., De. **844 204**

Processes for the preparation of 2,6-dialkyl phenols. Bataafsche Petroleum Maatschappij **843 745**

Interpolymers of low inflammability. Farbenfabriken Bayer AG. **843 746**

Monoazo-pyrazole dyestuffs and their use. Geigy AG., J. R. **844 427**

Plastic compositions. U.S. Rubber Co. **844 141**

Moulding rade copolymers and process for preparing the same. Dow Chemical Co. **843 896**

Production of granulated urea. Inventa AG Für Forschung Und Patentverfertung. **844 294**

Polyphosphates. Unilever Ltd. **844 295**

Method of preparing 10-aminode-canoic acid and esters thereof. Montecatini Societa Generale Per l'Industria Mineraria E. Chimica. **844 031**

Polymerisation of olefins, and the resulting polyolefins. Bataafsche Petroleum Maatschappij N.V., De. **843 750**

Process for the preparation of unsaturated ionones. Hoffmann-La Roche & Co. AG, F. **843 751**

Cyclopentanophenanthrene compounds. Laboratories Francais De Chimiotherapie. **843 901**

Production of stable polychloroprene. Farbenfabriken Bayer AG. **843 906**

Pyrolytic cracking of light petroleum fractions. Metallgesellschaft AG. **843 909**

Distillation of esters. Esso Research & Engineering Co. **844 033**

Derivative of isonicotinothioamide. Chimie Et Atomistique. **843 756**

Process for the preparation of acid-free aqueous hydrogen peroxide. Bataafsche Petroleum Maatschappij N.V., De. **844 029**

Heterocyclic hydrazine derivatives and a process for the manufacture thereof. Hoffmann-La Roche & Co. AG, F. **844,030**

Production of solid polymers of unsaturated hydrocarbons. Petrochemicals Ltd. **844 437**

Conditioning of phthalocyanine pigments. General Aniline & Film Corporation. **843 759**

Crystalline pantothenic acid esters and a process for their production. Bracco Industria Chimica S.P.A. **844 439**

Process of producing benzene alkylates. Universal Oil Products Co. **844 042**

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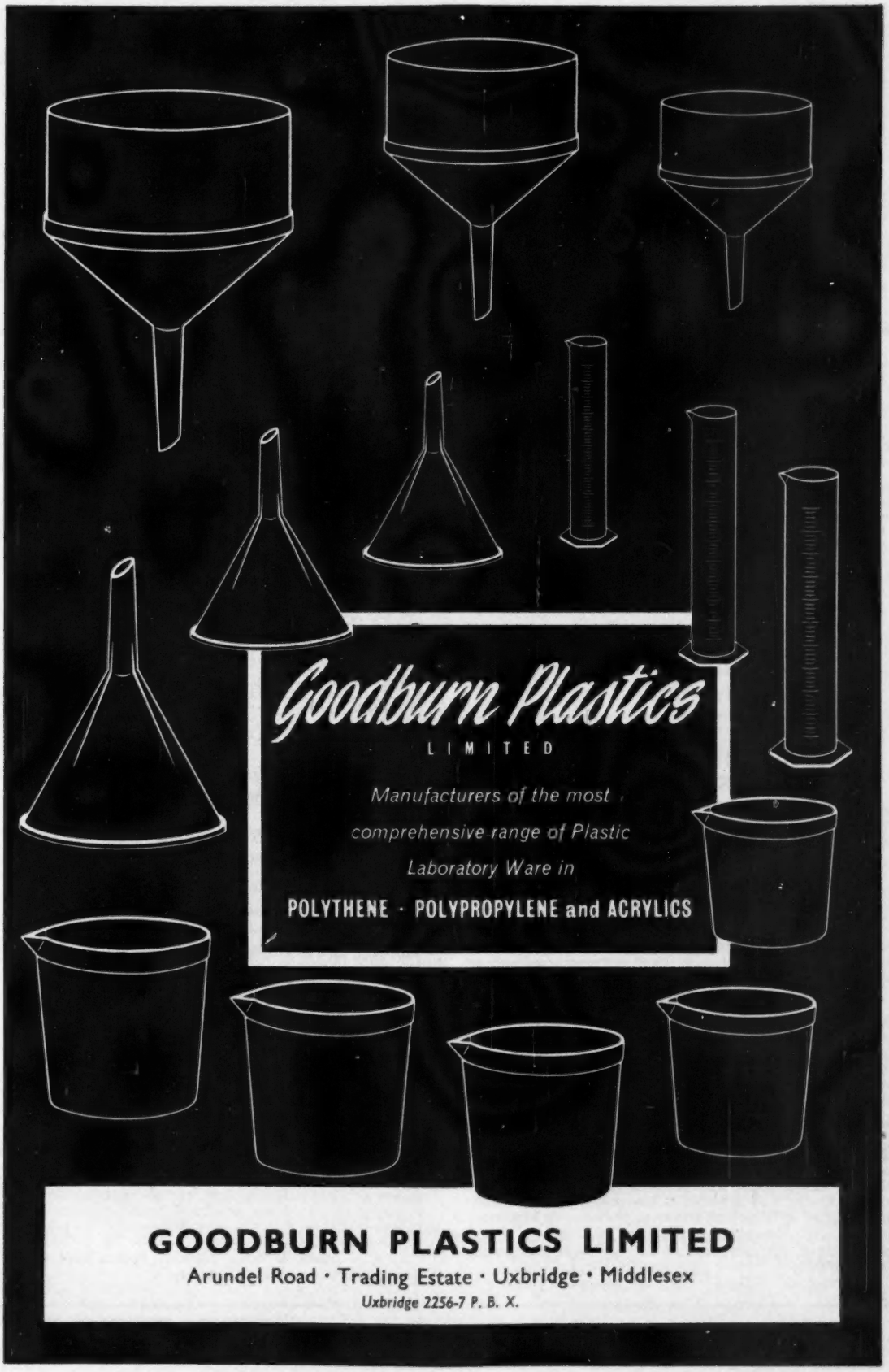
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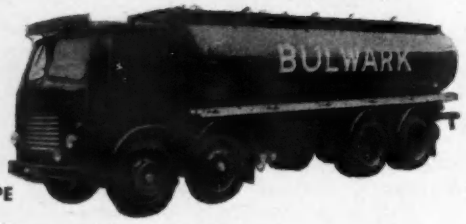

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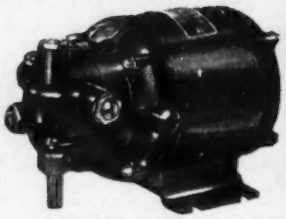

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R.P.M.	TORQUE	R.P.M.	TORQUE
600	10 oz. in.	37.5	4 lb. in.
300	16 oz. in.	25	4 lb. in.
150	24 oz. in.	18.8	4 lb. in.
100	32 oz. in.	12.5	4 lb. in.
75	36 oz. in.	9.4	4 lb. in.
50	3 lb. in.	6.25	4 lb. in.

SHADED-POLE INDUCTION GEARED MOTOR—Type 'FA'

R.P.M.	TORQUE	R.P.M.	TORQUE
216	4 oz. in.	13.5	24 oz. in.
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36	12 oz. in.	4.5	44 oz. in.
27	15 oz. in.	3.35	3 lb. in.
18	20 oz. in.	2.25	4 lb. in.

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200-600	9 oz. in.	12-37.5	4 lb. in.
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50-150	20 oz. in.	6-16.5	4 lb. in.
32-100	32 oz. in.	4-11	4 lb. in.
25- 75	40 oz. in.	3- 8.25	4 lb. in.
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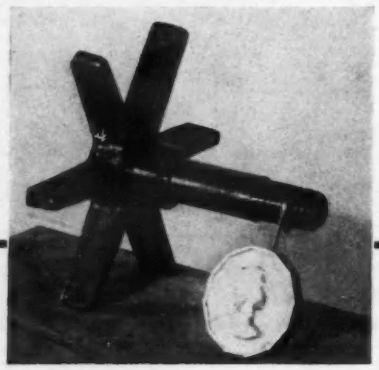

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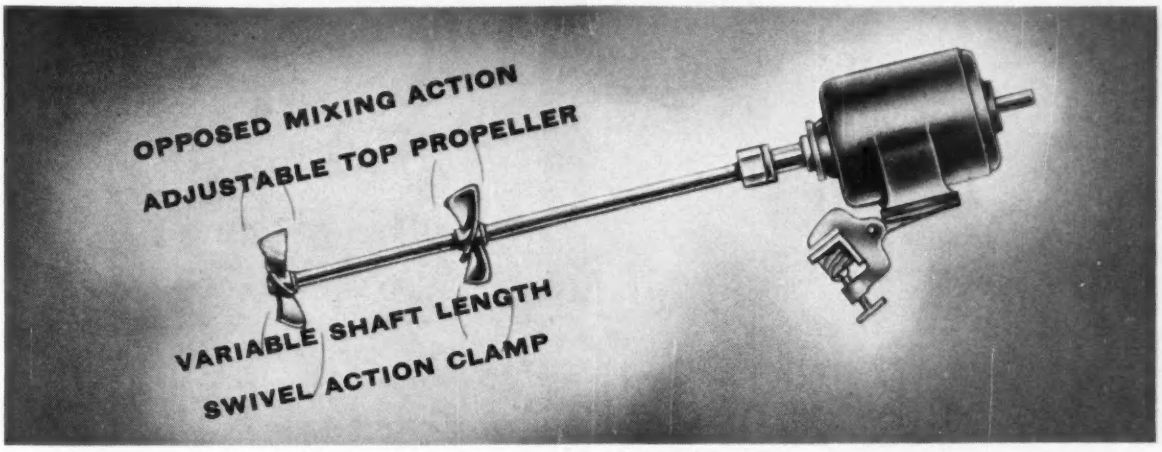

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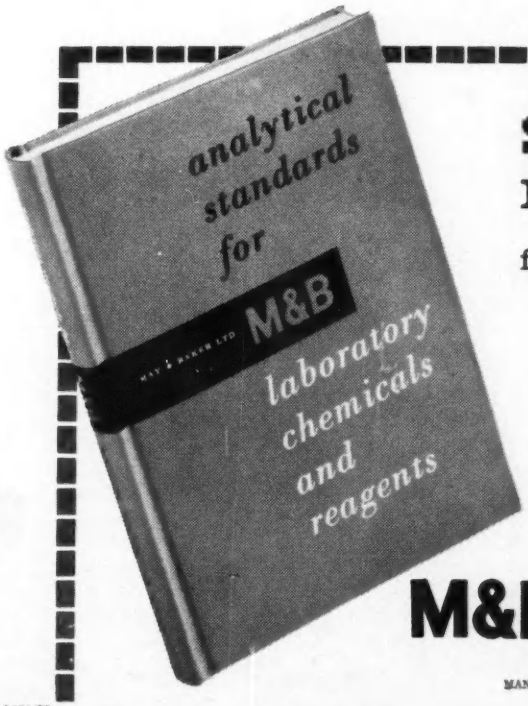

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